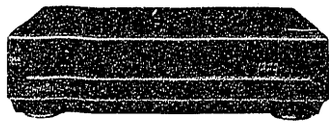
HITACHI

SERVICE MANUAL

TK | No. 3475E

VT-M250A
VT-M251A,AW

Technical Data



— VT-M250A —

— VT-M251A,AW —

SPECIFICATIONS

Recording:	Rotary two head Helical Scan Azimuth Recording
Video:	NTSC Color EIA Standard
Cassette:	VHS Type
Heads:	4 video heads 2 for SP, 2 for EP 1 Full track audio/video erase head 1 Combination head for control track, audio erase and audio record/play (3 heads/single housing)
Tape Speed:	33.35 mm/sec (SP), 16.67 mm/sec (LP) (playback only), 11.12 mm/sec (EP)
Tape Width:	12.7 mm
RF Output:	Channel 3 or Channel 4
RF Input:	UHF/VHF 75 ohm
Tuning Range:	VHF LOW CH, 2 ~ 6 (54 MHz — 88 MHz) VHF MID CH, A-5 ~ A-1 and A ~ I (90 MHz — 174 MHz) CATV VHF HIGH CH, 7 ~ 13 (174 MHz — 216 MHz) VHF SUPER CH, J ~ W (216 MHz — 300 MHz) CATV VHF HYPER CH, W+1 ~ W+28 (300 MHz — 468 MHz) CATV UHF CH, 14 ~ 69, W+29 ~ W+84 (470 MHz — 806 MHz)
Video Input:	1 — 2 Vp-p 75 ohm Unbalanced
Video Output:	1 Vp-p 75 ohm Unbalanced
Audio Input:	316 mV rms (—7.8 dB) 100 kohm
Audio Output:	316 mV rms (—7.8 dB) 600 ohm
Video Recording S/N:	Better than 46 dB (SP), Better than 40 dB (EP)
Horizontal Resolution:	240 lines (SP), 230 lines (EP)
Audio Response:	50 Hz ~ 10 kHz (SP), 100 Hz ~ 6 kHz (EP)
Audio S/N:	Better than 43 dB (SP), Better than 40 dB (EP)
Power Input:	AC 120V 60 Hz
Power Consumption:	23W Nominal
Cabinet Size:	14-9/16"(W) x 3-1/2"(H) x 12-5/8"(D) 37.0(W) x 8.9(H) x 32.0(D) cm
Weight:	11.7 lbs (5.3 kg)
Accessories:	1 — Coaxial cable 1 — Remote control unit 2 — Batteries

Design and Specifications subject to change without notice.

VHS

This video deck is a VHS type video recorder. For proper operation, only the VHS type cassette must be used.

MANUALS RELATED TO THE VT-M250A

Name of Manual	Language	Manual No.	Chapters included
Technical Data	English	3475E	Chapters 1-6
Adjustment	French	3477F	Chapters 3, 4
Technical Information	English	3476E	———

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

VIDEO CASSETTE RECORDER

June 1991 TOKAI WORKS

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SAFETY PRECAUTIONS

NOTICE: Comply with all cautions and safety related notes located on or inside the cabinet and on the chassis.

1. When replacing a chassis in the instrument, all the protective devices must be put back in place, such as barriers, non-metallic knobs, adjustment and compartment covers/shields, isolation resistors/capacitors, etc.
2. When service is required, observe the original lead-dress. Extra precautions should be taken to assure correct lead dress in the high voltage circuit.
3. Always use the manufacturer's replacement components. Especially critical components as indicated on the circuit diagram should not be replaced by other manufacturer's. Furthermore, where a short-circuit has occurred, replace those components that indicate evidence of overheating.
4. Before returning an instrument to the customer, the service technician must thoroughly test the unit to be certain that it is completely safe to operate without danger of electrical shock, and be sure that no protective device built into the instrument by the manufacturer has become defective or inadvertently defeated during servicing.

Therefore, the following checks should be performed for the continued protection of the customer and service technician.

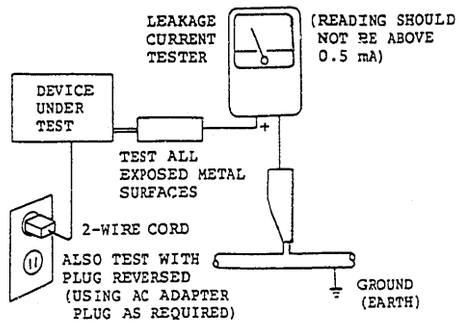
Leakage Current Cold Check

With the AC plug removed from the AC120V, 60Hz source, place a jumper across the two plug prongs. Turn the AC power switch on. Using an insulation tester (DC500V), connect one lead to the jumpered AC plug and touch the other lead to exposed metal parts (antennas, screwheads, metal overlays, control shafts, etc.), particularly any exposed metal part having a return path to the chassis. Exposed metal parts having a return path to the chassis should have a minimum resistor reading of 0.3 Mohm and a maximum resistor reading of 5 Mohm. Any resistor value below or above this range indicates an abnormality which requires corrective action. Exposed metal parts not having a return path to the chassis will indicate an open circuit.

Leakage Current Hot Check

Plug the AC line cord directly into a AC120V, 60 Hz outlet (do not use an isolation transformer for this check).

Turn the AC power switch on. Using a "Leakage Current Tester", measure for current from all exposed metal parts of the cabinet (antennas, screwheads, metal overlays, control shaft, etc.), particularly an exposed metal part having a return path to the chassis, to a known ground (earth) (water pipe, conduit, etc.). Any current measured must not exceed 0.5 mA.


LEAKAGE CURRENT TESTER
(READING SHOULD NOT BE ABOVE 0.5 mA)
DEVICE UNDER TEST
TEST ALL EXPOSED METAL SURFACES
2-WIRE CORD
ALSO TEST WITH PLUG REVERSED (USING AC ADAPTER PLUG AS REQUIRED)
GROUND (EARTH)

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE UNIT TO THE CUSTOMER.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts have special safety-related characteristics. These are often not evident from visual inspection nor can the protection afforded by them necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.
Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.
The use of a substitute replacement component which does not have the same safety characteristics as the HITACHI recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards. Product safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current HITACHI Service Manual. A subscription to, or additional copies of, HITACHI Service Manual may be obtained at a nominal charge from HITACHI SALES CORPORATION.

FOR CANADA

CAUTION AGAINST FUSE REPLACEMENT

FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH SAME TYPE AND SAME RATING FUSE IN ACCORDANCE WITH THE FUSE SYMBOL LABEL.

The following is the indication of the fuse symbol label which is affixed adjacent to the fuse in the equipment.

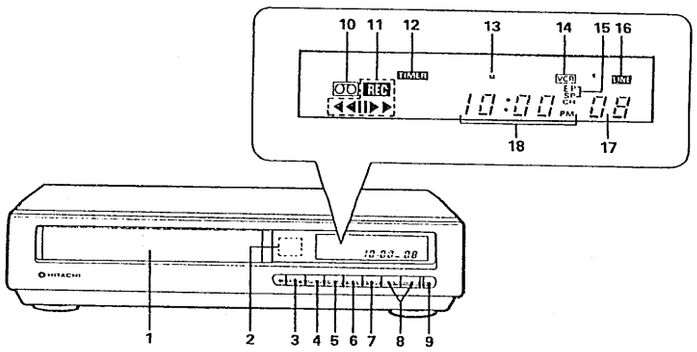
* Example

This symbol indicates Fast Operating Type 2A, 250V Fuse.

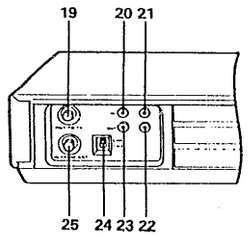
COMPARISON WITH PREVIOUS MODEL

	ITEM	VT-M250A/M251A	VT-M150A/M151A
FEATURES	REC /PLAY SYSTEM	VHS	VHS
	HQ (HIGH QUALITY)	USED	USED
	COMB FILTER	USED	USED
	NUMBER OF CHANNELS	181 CH	181 CH
	CHANNEL PRESET	F.S AUTO TUNING	F.S AUTO TUNING
	CHANNEL SELECT	UP/DOWN, 10 KEYS	UP/DOWN, 10 KEYS
	CATV/NOR. SELECT (CATV 1/2)	YES (OSD)	YES (OSD)
	TIMER REC PROGRAM	8 PROGRAMS / 1 YEAR	8 PROGRAMS / 1 YEAR
	TIMER BACK-UP	ABOUT 30 MIN.	ABOUT 5 SEC.
	MODE DISPLAY	OSD / FL DISPLAY	OSD / FL DISPLAY
	TIMER PROGRAMMING	OSD (BY REMOTE CONTROL)	OSD (BY REMOTE CONTROL)
	CHANNEL TUNING	OSD (BY REMOTE CONTROL)	OSD (BY REMOTE CONTROL)
	CLOCK SETTING	OSD (BY REMOTE CONTROL)	OSD (BY REMOTE CONTROL)
	TV SELECT BUTTON	YES (BY REMOTE CONTROL)	YES (BY REMOTE CONTROL)
	IRT START BUTTON	NO	NO
	IRT LENGTH BUTTON	YES	YES
	COUNTER DISPLAY	OSD/FL DISPLAY	OSD/FL DISPLAY
	SCANAPLAY INDEX	YES	YES (VT-M151A/M151AW)
	COUNTER GO-TO	YES	YES (VT-M151A/M151AW)
	AUTO TRACKING	YES	NO
	LINE/TUNER SELECTOR	YES	YES
	PICTURE CONTROL	NO	NO
	INTELASCAN GUIDE	YES	YES
	INSULATOR	YES	YES (VT-M151A/M151AW)
	TIME REMAIN	NO	NO
	FRONT A/V INPUT	YES (VT-M251A/M251AW)	NO
	SYNCHRO EDIT JACK	YES (VT-M251A/M251AW)	NO
	HIGH SPEED REWIND	YES (VT-M251A/M251AW)	NO
CHASSIS	BASIC CHASSIS TYPE	PZ (QUICK MECHANISM)	PZ (QUICK MECHANISM)
	HALF LOADING MECHANISM	PROVIDED	PROVIDED
	HEADS ON CYLINDER	DA4 HEADS	2 HEADS
	HEAD CLEANING MECHANISM	PROVIDED	PROVIDED
MAIN CONTROL ICs	VIDEO CIRCUIT		
	LUMINANCE / CHROMA PROCESS	HA118158NT -M250A- (IC201) HT7233E -M251A- (IC201) HT7213 -M251AW- (IC201)	HA118158NT (IC201) HA118157NT -M150AW - (IC201)
	CCD 1H DELAY	CXL5507P (IC203)	CXL5507P (IC202)
	AUDIO CIRCUIT		
	AUDIO AMP	XRA7767A or BA7767 (IC401)	LA7297 (IC401)
	SERVO CIRCUIT		
	PHASE / SPEED CONT.	HD49741NT (IC601)	HD49741NT (IC601)
	FG AMP	———	BA6993 (IC602)
	CYLINDER MOTOR DRIVE	XRA6459P1 or BA6459P1 (IC1651)	BA6459P1 (IC1651)
	TIMER / SYSTEM CONTROL CIRCUIT		
	MAIN μP	M38174M8-107FP (IC751)	CXP50120-112Q (IC751)
	LOADING MOTOR DRIVE	XRA6209U4 or BA6209U4 (IC753)	BA6209U4 (IC753)
	RESET	S8053ALB (IC754)	PST529I (IC755)
	OSD CIRCUIT		
	CG μP	M50458-084FP (IC1401)	μPD6450C-703 (IC1401)
	H.SYNC GEN	BA7046A (IC1441)	———
	POWER SUPPLY CIRCUIT		
	5.6V REGULATOR	M5F7805 -M250A/M251A- (IC851) SWITCHING REGULATOR -M251AW-	M5F7805 (IC864)

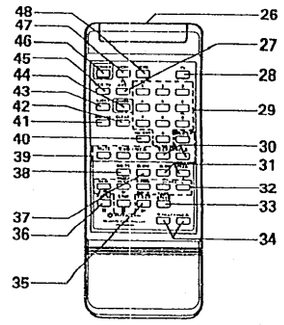
CONTROLS AND FEATURES (For VT-M250A)



1. **CASSETTE COMPARTMENT**
   Insert a cassette in through a door, and loading will be completed automatically.
   Note: Power is turned on automatically when the cassette is loaded.
2. **INFRARED RAY RECEIVING SECTION**
   Receives the infrared ray from remote control unit.
3. **POWER BUTTON**
   Turn system power on and off.
4. **STOP/EJECT BUTTON**
   If this button is pressed, while the set is operating, the running of tape stops and all operating modes are cancelled (except for timer recording). The cassette is ejected, when this button is pressed again in STOP mode.
   Note: Power may be on or off when removing the cassette.
5. **REWIND BUTTON**
   Press to start rewind.
   Press this button during playback, and reverse playback picture at high speed can be seen.
6. **PLAY BUTTON**
   Press to start play.
7. **FAST FORWARD BUTTON**
   Press to activate fast forward.
   Press this button during playback, and forward playback picture at high speed can be seen.
8. **CHANNEL SELECT BUTTONS**
   Select the channels you wish to view or to record by pressing these buttons.
   And you can also select "LINE"* by pressing these buttons to record or watch the program input at the VIDEO IN and AUDIO IN.
   (*One channel position either higher or lower outside the range of your preset channels.)
9. **RECORD/IRT BUTTON**
   Press to start recording.
10. **TAPE-IN INDICATOR**
    Lights when cassette is loaded in the compartment.
11. **VCR MODE INDICATOR**
    - REC appears during recording.
    - ◁◁ appears during the rewind mode.
    - ▷▷ appears during the fast-forward mode.
    - ▷ appears during the playback.
    - ▯▯ appears when the PAUSE button is pressed during record or play mode and disappears when the PAUSE button is pressed again.



12. **TIMER INDICATOR**
    Will light when turning power off after programming.
13. **MEMORY INDICATOR**
    Appears when the DISPLAY button is pressed when the counter is displayed on TV screen or VCR's display. Rewind the tape with "M" lit, and the tape stops when the counter reads "0:00:00".
14. **VCR INDICATOR**
    Appears when the VCR is turned on or the VCR is in the playback mode.
15. **TAPE SPEED INDICATORS**
16. **LINE INDICATOR**
    Lights when you select the LINE position by pressing the AVX button or CHANNEL select button. LINE position is used to record or watch the program input at the VIDEO IN and AUDIO IN.
17. **CHANNEL INDICATOR**
18. **CLOCK DISPLAY**
    Shows the clock and tape counter.
19. **ANTENNA OUTPUT**
    Connect this terminal to the antenna terminal on the back of the TV.
20. **VIDEO IN**
    Receives video signal from a video camera or another VCR.
21. **AUDIO IN**
    Receive audio signals from a stereo system or another VCR.
22. **AUDIO OUT**
    For a connection to a monitor or another VCR.

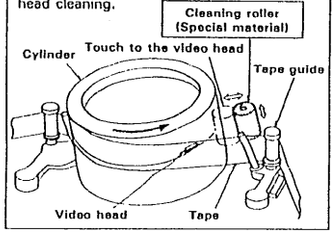


23. **VIDEO OUT**
    For connection to monitor TV.
24. **RF CONVERTER SWITCH**
    Set this switch to whichever channel (CH3 or CH4) is unused in your area.
25. **ANTENNA INPUT**
    Connect the UHF and/or VHF antenna to this terminal.
26. **SIGNAL TRANSMISSION WINDOW**
    Transmits an invisible light beam (infrared) from the remote control unit to the VCR.
27. **AVX BUTTON**
    Press to select tuner position to record or view an off-the-air TV program (through the VCR's built-in tuner) or the "LINE" position to record or view the program input through the video and audio line input jacks.
28. **TV BUTTON**
    First press this button when operating your TV with this remote control, and then press the button which corresponds to the function you want.
29. **NUMBER BUTTONS "0" THROUGH "9"**
    Select any channel (whether or not it is in the "Tuner Scan List") by pressing two buttons. (Press "0" and then "8" for channel 8.)
    The number buttons are also used for setting the clock and programming the timer.
30. **CHANNEL SELECT BUTTONS**
    Same as the buttons on the VCR.

31. **SLOW SPEED BUTTONS**
    During slow playback the slow speed can be adjusted by pressing the SLOW SPEED button.
32. **VCR CONTROL BUTTONS**
    These buttons (except for "REC" buttons) function same as the buttons on your VCR.
    Note: The REC buttons must be pressed simultaneously to start recording.
33. **TAPE SPEED SELECT BUTTON**
    Recording time using Cassette tape T-160:
    EP: 8 hours SP: 2.6 hours
    Notes:
    - Playback speed automatically corresponds with recorded speed.
    - This VCR cannot record in LP mode, but can play LP recorded tapes.
34. **TRACKING CONTROL BUTTONS**
    To minimize noise in playback.
35. **FRAME ADVANCE BUTTON**
    Press to view tape one frame at a time.
    Operates only after PAUSE button has been pressed.
36. **PAUSE BUTTON**
    Press to pause during recording or playback.
37. **SLOW BUTTON**
    Allows you to view a picture at slow speed.
38. **GO-TO/INDEX BUTTON**
    Press this button to search for the scene you want to view using the counter GO-TO or INDEX feature.
39. **TV CONTROL BUTTONS**
    Used for controlling the TV.
40. **100/ENT BUTTON**
    Used to select TV or CATV channels.
    Press "100", "2", "3" in this order to select channel 123. Press "100", "0" and "5" for channel 105.
41. **DISPLAY BUTTON**
    1st Press .... Calls up the mode display on TV screen.
    2nd Press (before display disappears) .... The display on TV screen disappears except for "Linear Time Counter".
    Also changes the VCR's display from the clock to the counter.
    3rd Press .... The counter memory "M" appears on TV screen and in VCR's display.
    4th Press .... Clears the display on TV screen. Also changes the VCR's display from the counter to the clock.
42. **CLEAR BUTTON**
    Used for programming the timer.
    And also used for counter reset button.
43. **EJECT BUTTON**
    When this button is pressed in modes other than recording, the tape stops, and the cassette is ejected.
44. **INTELASCAN GUIDE BUTTON**
    Press this button to use the Intelascan feature.
45. **VCR/TV SELECT BUTTON**
    Selects the signal to be viewed.
    The VCR indicator comes on when the unit is in VCR mode and the signal received by the VCR is displayed on the TV screen.
    With the switch in the TV position (indicator light off) the broadcast signal is received directly by your TV set. When the VCR power is turned off, the VCR automatically switches to "TV".
46. **POWER BUTTON**
    Press to turn VCR on. Press again to turn VCR off.
47. **VCR1 BUTTON**
    First press this button when operating the VCR with this remote control and then press the button which corresponds to the function you want.
48. **VCR 2 BUTTON**
    Press this button when using another Hitachi VCR and operating the remote control provided to control the two VCRs.

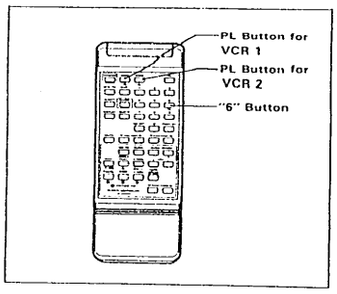
Auto Head Cleaning System

This system cleans the video heads automatically when a cassette is inserted and ejected or the power is turned on or off while a cassette is in the VCR, to prevent dirt from accumulating on the heads.
NOTE: Mechanical sound is heard during head cleaning.



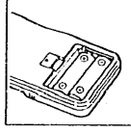
PL (Parent Lock) Button

When this button and button "6" are pressed simultaneously, the buttons on the front panel of the VCR cannot be operated. This prevents children from operating the VCR without their parents approval.
To release the lock, press the PL button and button "6" simultaneously or press the POWER button of the remote control.
You can select the VCR 1 or VCR 2 remote mode with this VCR. If you press the VCR 2 (PL) button and button "6" simultaneously when VCR 2 is selected, for example, the VCR cannot be operated by the operation buttons on the VCR.



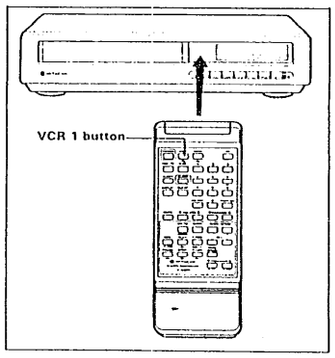
USING THE REMOTE CONTROL UNIT

HOW TO INSTALL BATTERIES



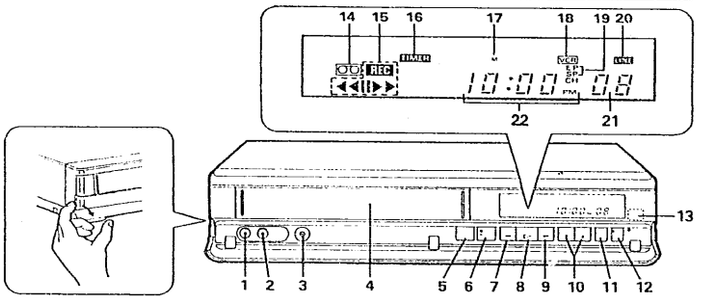
NOTES:
1. Be sure to install two "AA" size batteries before use.
2. Be aware of the polarity.

Aim the remote control at the receiver on the front panel of the VCR.

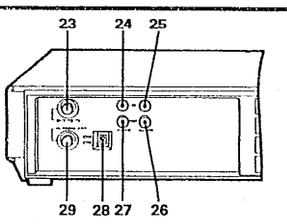


NOTES:
1. If the range is short, try new batteries.
2. An object in between the VCR and remote control unit may block the invisible light beam and operation will not be possible.
3. If you cannot operate the VCR with this remote control, first press the VCR 1 button and then press the button which corresponds to the VCR function you want.

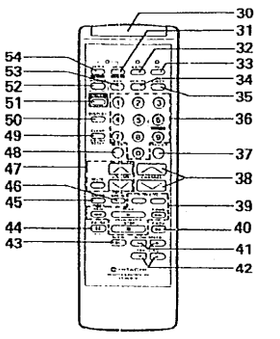
CONTROLS AND FEATURES (For VT-M251A,AW)



1. **VIDEO IN**
   Receives video signal from a video camera or another VCR.
2. **AUDIO IN**
   Receives audio signals from a stereo system or another VCR.
   Note: There are AUDIO IN/VIDEO IN jacks on both the front and rear panels. The front jacks have priority over the rear jacks. Do not connect any equipment to the jacks on the front panel when using the AUDIO IN/VIDEO IN jacks on the rear pael.
3. **EDIT IN/OUT JACK**
   This jack allows you to connect selected models of VCR's and video camera using optional synchro edit cables.
4. **CASSETTE COMPARTMENT**
   Insert a cassette in through a door, and loading will be completed automatically.
   Note: Power is turned on automatically when the cassette is loaded.
5. **POWER BUTTON**
   Turn system power on and off.
6. **STOP/EJECT BUTTON**
   If this button is pressed, while the set is operating, the running of tape stops and all operating modes are cancelled (except for timer recording). The cassette is ejected, when this button is pressed again in STOP mode.
   Note: Power may be on or off when removing the cassette.
7. **REWIND BUTTON**
   Press to start rewind.
   Press this button during playback, and reverse playback picture at high speed can be seen.
8. **PLAY BUTTON**
   Press to start play.
9. **FAST FORWARD BUTTON**
   Press to activate fast forward.
   Press this button during playback, and forward playback picture at high speed can be seen.
10. **CHANNEL SELECT BUTTONS**
    Select the channels you wish to view or to record by pressing these buttons.
    And you can also select "LINE"* by pressing these buttons to record or watch the program input at the VIDEO IN and AUDIO IN.
    (*One channel position either higher or lower outside the range of your preset channels.)
11. **HEAD CLEANING BUTTON**
    Press this button to manually clean the video heads when the dirt cannot be removed by auto cleaning.
12. **RECORD/IRT BUTTON**
    Press to start recording.
13. **INFRARED RAY RECEIVING SECTION**
    Receives the infrared ray from remote control unit.
14. **TAPE-IN INDICATOR**
    Lights when cassette is loaded in the compartment.



15. **VCR MODE INDICATOR**
    - REC appears during recording.
    - ◁◁ appears during the rewind mode.
    - ▷▷ appears during the fast-forward mode.
    - ▷ appears during the playback.
    - ▯▯ appears when the PAUSE button is pressed during record or play mode and disappears when the PAUSE button is pressed again.
16. **TIMER INDICATOR**
    Will light when turning power off after programming.
17. **MEMORY INDICATOR**
    Appears when the DISPLAY button is pressed when the counter is displayed on TV screen or VCR's display. Rewind the tape with "M" lit, and the tape stops when the counter reads "0:00:00".
18. **VCR INDICATOR**
    Appears when the VCR is turned on or the VCR is in the playback mode.
19. **TAPE SPEED INDICATORS**
20. **LINE INDICATOR**
    Lights when you select the LINE position by pressing the AVX button or CHANNEL select button. LINE position is used to record or watch the program input at the VIDEO IN and AUDIO IN.
21. **CHANNEL INDICATOR**
22. **CLOCK DISPLAY**
    Shows the clock and tape counter.
23. **ANTENNA OUTPUT**
    Connect this terminal to the antenna terminal on the back of the TV.
24. **VIDEO IN**
25. **AUDIO IN**

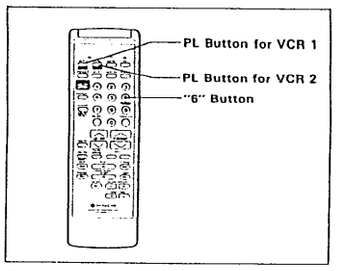


26. **AUDIO OUT**
    For a connection to a monitor or another VCR.
27. **VIDEO OUT**
    For connection to monitor TV.
28. **RF CONVERTER SWITCH**
    Set this switch to whichever channel (CH3 or CH4) is unused in your area.
29. **ANTENNA INPUT**
    Connect the UHF and/or VHF antenna to this terminal.
30. **SIGNAL TRANSMISSION WINDOW**
    Transmits an invisible light beam (infrared) from the remote control unit to the VCR.
31. **VCR 2 BUTTON**
    Press this button when using another Hitachi VCR and operating the remote control provided to control the two VCRs.
32. **CATV BUTTON**
    First press this button when operating your Cable Converter with this remote control, and then press the button which corresponds to the function you want.
33. **TV BUTTON**
    First press this button when operating your TV with this remote control, and then press the button which corresponds to the function you want.

34. **VCR/TV SELECT BUTTON**
    Selects the signal to be viewed.
    The VCR indicator comes on when the unit is in VCR mode and the signal received by the VCR is displayed on the TV screen. With the switch in the TV position (indicator light off) the broadcast signal is received directly by your TV set. When the VCR power is turned off, the VCR automatically switches to "TV".
35. **EJECT BUTTON**
    When this button is pressed in modes other than recording, the tape stops, and the cassette is ejected.
36. **NUMBER BUTTONS "0" THROUGH "9"**
    Select any channel (whether or not it is in the "Tuner Scan List") by pressing two buttons. (Press "0" and then "8" for channel 8.)
    The number buttons are also used for setting the clock and programming the timer.
37. **PREV CH BUTTON**
    Used to control the TV.
    You need not press the TV button before pressing this button.
38. **CHANNEL SELECT BUTTONS**
    Same as the buttons on the VCR.
39. **VCR CONTROL BUTTONS**
    These buttons (except for "REC" buttons) function same as the buttons on your VCR.
    Note: The REC buttons must be pressed simultaneously to start recording.
40. **FRAME ADVANCE BUTTON**
    Press to view tape one frame at a time.
    Operates only after PAUSE button has been pressed.
41. **SLOW SPEED BUTTONS**
    During slow playback the slow speed can be adjusted by pressing the SLOW SPEED button.
42. **TRACKING CONTROL BUTTONS**
    To minimize noise in playback.
43. **SLOW BUTTON**
    Allows you to view a picture at slow speed.
44. **PAUSE BUTTON**
    Press to pause during recording or playback.
45. **GO-TO/INDEX BUTTON**
    Press this button to search for the scene you want to view using the counter GO-TO or INDEX feature.
46. **TAPE SPEED SELECT BUTTON**
    Recording time using Cassette tape T-160:
    EP: 8 hours SP: 2.6 hours
    Notes:
    - Playback speed automatically corresponds with recorded speed.
    - This VCR cannot record in LP mode, but can play LP recorded tapes.
47. **TV CONTROL BUTTONS**
    Used for controlling the TV.
48. **100/ENT BUTTON**
    Used to select TV or CATV channels.
    Press "100", "2", "3" in this order to select channel 123. Press "100", "0" and "5" for channel 105.
49. **CLEAR BUTTON**
    Used for programming the timer.
    And also used for counter reset button.
50. **DISPLAY BUTTON**
    1st Press .... Calls up the mode display on TV screen.
    2nd Press (before display disappeaars) .... The display on TV screen disappears except for "Linear Time Counter".
    Also changes the VCR's display from the clock to the counter.
    3rd Press .... The counter memory "M" appears on TV screen and in VCR's display.
    4th Press .... Clears the display on TV screen. Also changes the VCR's display from the counter to the clock.
51. **INTELASCAN GUIDE BUTTON**
    Press this button to use the Intelascan feature.
52. **POWER BUTTON**
    Press to turn VCR on. Press again to turn VCR off.
53. **AVX BUTTON**
    Press to select tuner position to record or view an off-the-air TV program (through the VCR's built-in tuner) or the "LINE" position to record or view the program input through the video and audio line input jacks.
54. **VCR1 BUTTON**
    First press this button when operating the VCR with this remote control and then press the button which corresponds to the function you want.

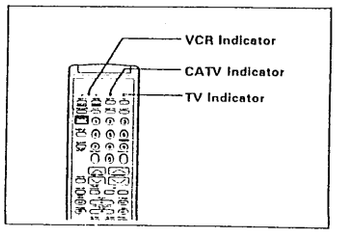
■ PL (Parent Lock) Button

When this button and button "6" are pressed simultaneously, the buttons on the front panel of the VCR cannot be operated. This prevents children from operating the VCR without their parents approval.
To release the lock, press the PL button and button "6" simultaneously or press the POWER button of the remote control.
You can select the VCR 1 or VCR 2 remote mode with this VCR. If you press the VCR 2 (PL) button and button "6" simultaneously when VCR 2 is selected, for example, the VCR cannot be operated by the operation buttons on the VCR.



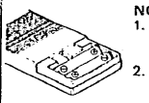
■ VCR/CATV/TV Indicators

This remote control can operate the VCR, TV and Cable Converter. When a button such as "0" – "9", "POWER" used in common to command the VCR, TV and Cable Converter is pressed, the corresponding indicator lights to show which mode the remote control is in. When a button is pressed and the TV indicator lights, you can operate the TV.



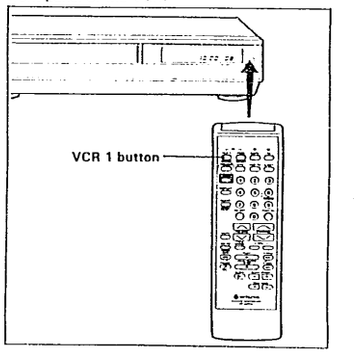
■ USING THE REMOTE CONTROL UNIT

HOW TO INSTALL BATTERIES



NOTES:
1. Be sure to install two "AA" size batteries before use.
2. Be aware of the polarity.

Aim the remote control at the receiver on the front panel of the VCR.

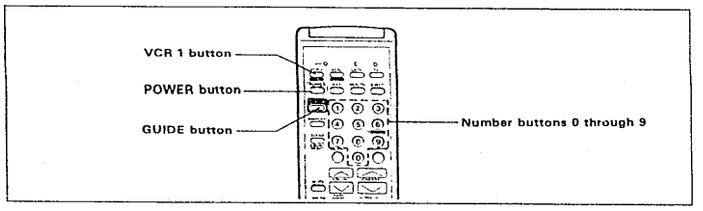


NOTES:
1. If the range is short, try new batteries.
2. An object in between the VCR and remote control unit may block the invisible light beam and operation will not be possible.
3. If you cannot operate the VCR with this remote control, first press the VCR 1 button and then press the button which corresponds to the VCR function you want.

SETTING THE CLOCK

Things to know before starting

- The clock uses the 12-hour system. (Be aware of AM and PM.)
- When you first plug in your VCR, the clock will read "– – : – –".
- While you are setting the clock, the "menu" display on the TV screen will prompt you through the procedures.
- If you press a wrong digit, press the CLEAR button repeatedly until the digit to be corrected flashes and then enter the correct digit.



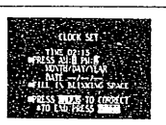
1. Turn on the power of both VCR and TV.
2. Be sure that the TV is set to the video channel (channel 3 or 4).
3. Aim the remote control unit at the receiver on the front panel of the VCR.

4. Press the GUIDE button until the "MENU", as illustrated, appears on the TV screen.
   NOTE: If the menu does not appear when the GUIDE button is pressed, press the VCR 1 button and then the GUIDE button.

Original menu

5. Press "2" button to set the clock.

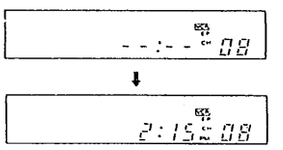
6. Set the hour by pressing two number buttons on the remote control unit and two more for the minute (for example, 0 2 1 5 for 2:15).



7. Press "1" for AM or "2" for PM.

8. Set the date by pressing six digits in order of month, day and year (for example, 0 3 1 7 9 1 for March 17, 1991).
   NOTE: Always press "0" before single-digit months and days.

9. Press GUIDE button to start the clock.
   NOTE: Now the display on the VCR will show the correct time.



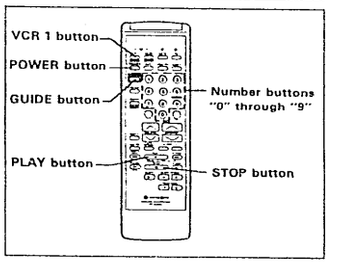
10. Press GUIDE button once again to return to the TV screen.

NOTES:

1. If you input an illogical time or date (13th month for example), this will not be accepted.
2. The clock must be set to the correct time before programming the timer for unattended recording or using the Instant Recording Timer (IRT) feature.
3. The display of Clock Setting procedures will resume the "original menu" if not further steps are followed in the setting for about 1 minute.
4. If power is interrupted for about 30 minutes "– – : – –" will appear on the display and Timer and Programming will need to be reset.

CHANNEL TUNING

The automatic programming feature makes it easy and convenient to program the TV station into the tuner's memory.
Automatic programming is usually a "one-time" procedure, but you will need to repeat it if you move to a location that has different channels, or if the power is interrupted for about 30 minutes.



1. Turn on the power of both VCR and TV.
2. Be sure that the TV is set to the video channel (channel 3 or 4).
3. Aim the remote control unit at the receiver on the front panel of the VCR.

4. Press the GUIDE button until the "MENU", as illustrated, appears on the TV screen.
   NOTE: If the menu does not appear when the GUIDE button is pressed, press the VCR 1 button and then the GUIDE button.

Original menu

5. Press button "1" for channel setting.

6. Press button "1" to select "NORMAL", "CATV1" or "CATV2". If your VCR is connected to a home antenna system, select "NORMAL"; select "CATV1" when your VCR is connected to a cable antenna. Switching is performed between "NORMAL", "CATV1" and "CATV2" on the TV screen every time button "1" is pressed.
   NOTE: Usually select "CATV1" when your VCR is connected to a cable antenna. "CATV2" is to be selected in special cases.

7. Press "2" button.
   The tuner will automatically cycle through all available channels in the area and place them in the tuner's memory. It takes about 2 – 3 minutes.
   The channel number will stop changing when the tuner is finished cycling. Programming is now completed.
   You can select the active channels by pressing the CHANNEL select buttons.

■ Eliminating unwanted preset channels

You may want to have only a few favorite channels in the tuner's memory so you can select them more quickly with the CHANNEL select button. Occasionally automatic programming may include a vacant channel in the tuner's memory if there happened to be some sort of "noise" or "stray signal" on the channel when the tuner was programmed. This procedure explains how to delete any unwanted channels from the tuner's memory.

1. Follow steps 1 through 5 of "Channel Tuning".

2. Press "3". The "menu", as illustrated, will appear on the TV screen.

3. Select the channel number by pressing buttons "0" through "9". (Press "0" and then "8" for channel 8.)
   Press the PLAY button to add channels and the STOP button to erase channels.
   Perform the same procedure to add or erase other channel numbers.
   NOTE: Erased channels cannot be selected by the CHANNEL button, but can be selected by buttons "0" through "9".
4. Press GUIDE button to return to the TV screen.

NOTE: There are some areas where channels cannot be switched when "CATV1" is selected. In this case, select "CATV2" as in step 6 on the previous page.

■ Adding channels to the tuner's memory

You may have deleted a channel from the tuner's memory and want to put it back. Occasionally automatic programming may "miss" an active channel because the signal is very weak or because the channel happened to be "off the air" when the tuner was programmed. Use this procedure to add any channel in the memory.

Your VCR is capable of receiving "off-the-air" TV channels (VHF 02 – 13, UHF 14 – 69) and CATV channels 01 – 125, a total of 181 channels*.

- You can receive channels 02 – 13 on both "off-the-air" and "cable" channels. Therefore, the total number of channels including "off-the-air" and "cable" channels is 181 channels (12 + 56 + 125 – 12 = 181).

■ To synchro edit the VCR's

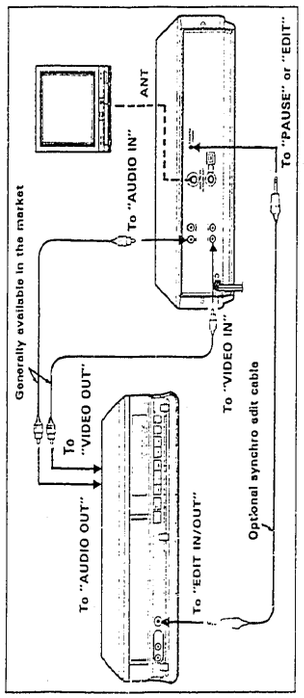
1. Turn on the VCR's and TV.
2. Insert the cassette that you want to copy in the playback VCR. Locate the place on the tape you want to begin coying and put the VCR in the play-pause mode.
3. Insert a cassette with the record-protect (safety) tab intact in the recording VCR. Put the recording VCR in the record-pause mode.
   Note: Make sure the recording VCR is in the line mode.
4. Press the PAUSE button on the playback VCR to start copying the tape. Both VCR's will start together.
5. Press the PAUSE button again when you want to stop copying the tape. Both VCR's will enter the pause mode.
   Note: If the next segment you want to copy is located farther away on the tape, use the F.FWD (fast forward), REWIND, or PLAY button on the playback VCR to locate the place on the tape you want to begin copying again. Then place the playback VCR in the play-pause mode. Press the PAUSE button again and both VCR's will begin copying.
6. Press the STOP buttons on both VCR's when you are finished.

SYNCHRO EDIT BY USING OPTIONAL SYNCHRO EDIT CABLE

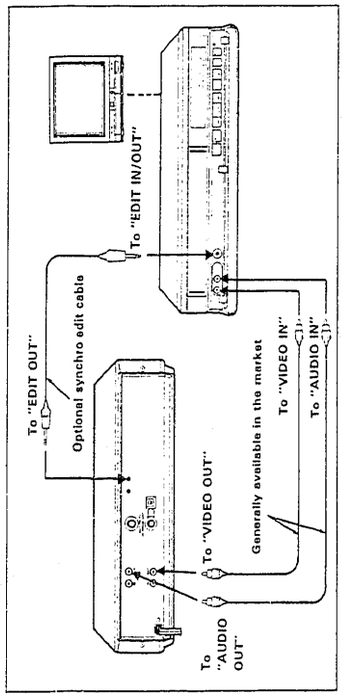
Synchro edit makes tape copying easy by connecting two compatible VCR's with an optional synchro edit cable.
When two VCR's are connected with a synchro edit cable, the playback VCR will automatically stop and start the recording VCR.

■ Connection

• When using this VCR as the playback VCR;



• When using this VCR as the recording VCR;



DISASSEMBLY

1. NAMES AND LOCATIONS OF CIRCUIT BOARDS
   (For VT-M250A)

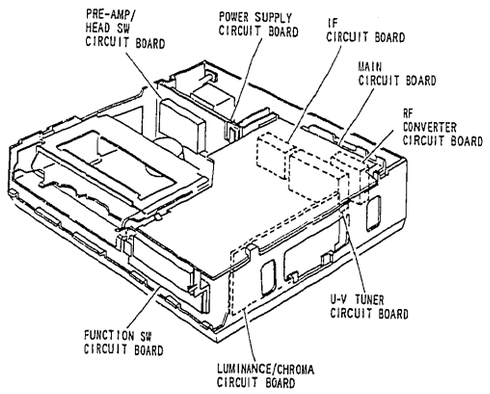


Fig. 1-1 Top View (For VT-M250A)

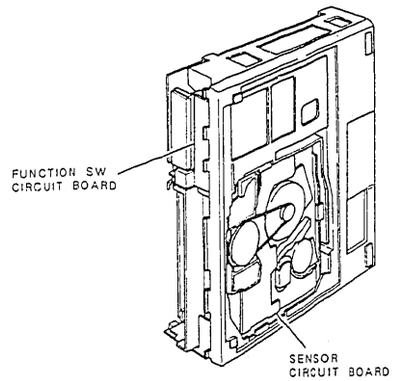


Fig. 1-2 Bottom View (For VT-M250A)

[Procedure when removing]
Remove the components in the order of letters (A, B, C ···) in the illustrations.
[Procedure when reinstalling]
Reinstall the components by the reverse procedure to removal when not otherwise specified.

2. CASE REMOVAL (For VT-M250A)

1. Top Cover

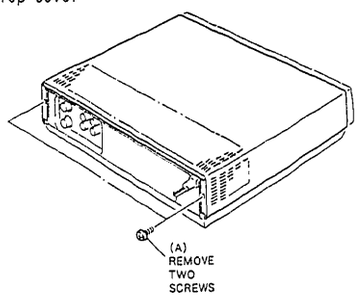


Fig. 2-1 (For VT-M250A)

2. Bottom Cover

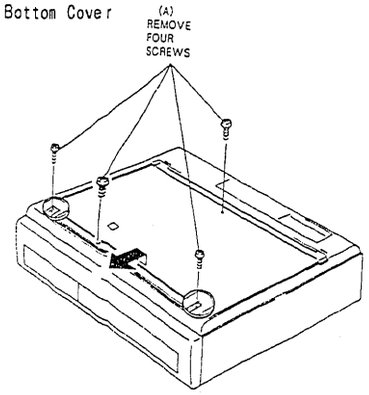


Fig. 2-2 (For VT-M250A)

3. Front Panel

* Components to remove first
1) Top Cover (Item 2-1)
2) Bottom Cover (Item 2-2)

[Caution when reinstalling]
· Reinstall the front panel while the cassette door is pushed in halfway, so that the boss of door actuating arm can be positively engaged with the recess on the side of the door as shown below.

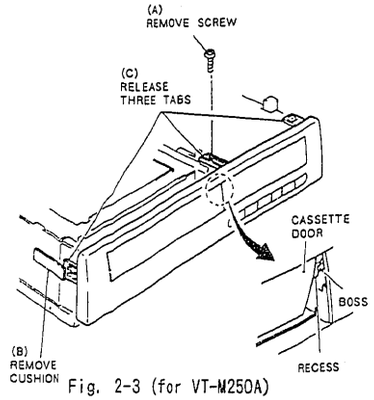


Fig. 2-3 (for VT-M250A)

4. Cassette Door

* Components to remove first
1) Front Panel (Item 2-3)

(Caution when reinstalling)
·Attach the spring at the right of the cassette door firmly.

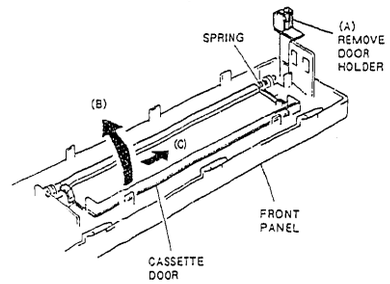


Fig. 2-4 (For VT-M250A)

5. Rear Panel

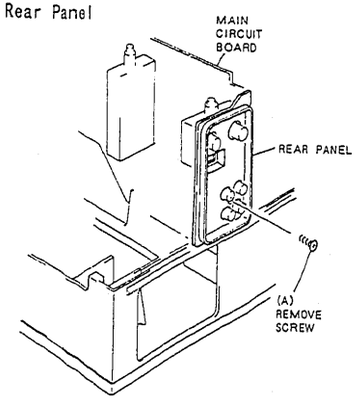


Fig. 2-5 (For VT-M250A)

Be sure to remove the cases when servicing and checking the circuit boards.
- Top Cover (see item 2-1)
- Bottom Cover (see item 2-2)
- Front Panel (see item 2-3)

3. CIRCUIT BOARD REMOVAL (For VT-M250A)

1. Function SW Circuit Board

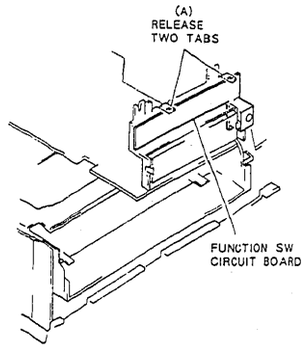


Fig. 3-1 (For VT-M250A)

2. Main Circuit Board

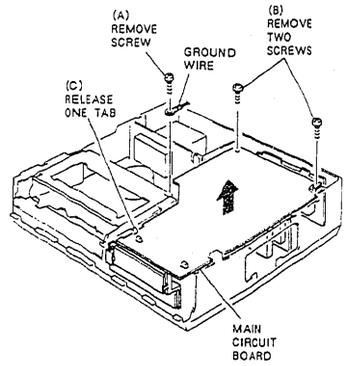


Fig. 3-2 (For VT-M250A)

3. Luminance/Chroma Circuit Board

(Before removing)
1) Remove the main circuit board. (See item 3-2)

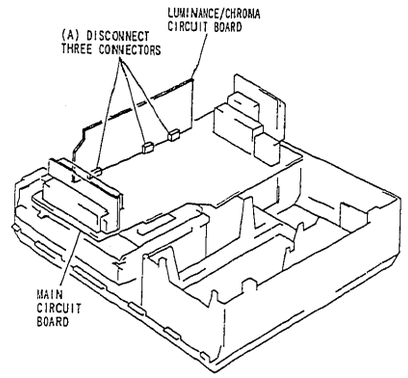


Fig. 3-3 (For VT-M250A)

4. Power Supply Circuit Board
5. Pre-Amp/Head SW Circuit Board

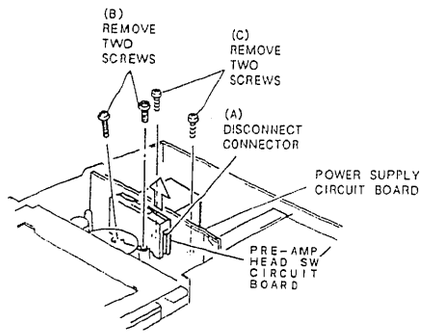


Fig. 3-4 (For VT-M250A)

6. Sensor Circuit Board

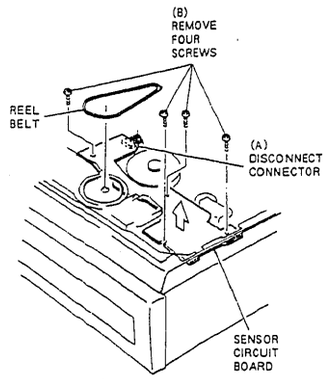


Fig. 3-5 (For VT-M250A)

4. NAMES AND LOCATIONS OF CIRCUIT BOARDS (For VT-M251A, AW)

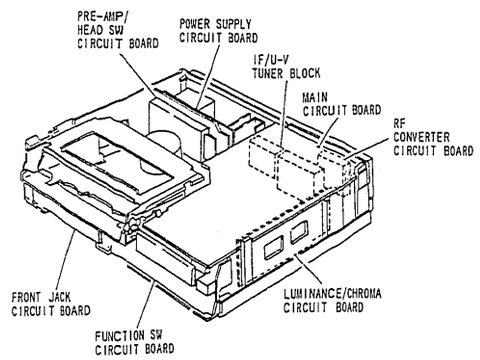


Fig. 4-1 Top View (For VT-M251A, AW)

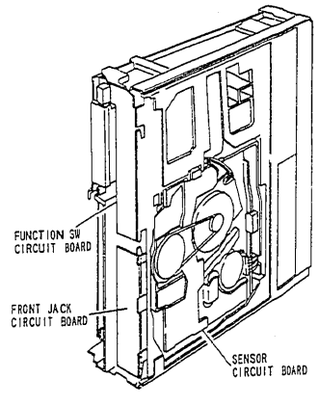


Fig. 4-2 Bottom View (For VT-M251A, AW)

(Procedure when removing)
Remove the components in the order of letters (A, B, C ···) in the illustrations.
(Procedure when reinstalling)
Reinstall the components by the reverse procedure to removal when not otherwise specified.

5. CASE REMOVAL (For VT-M251A, AW)

1. Top Cover

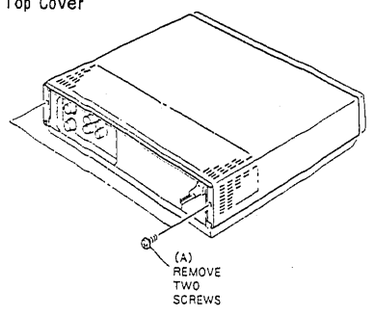


Fig. 5-1 (For VT-M251A, AW)

2. Bottom Cover

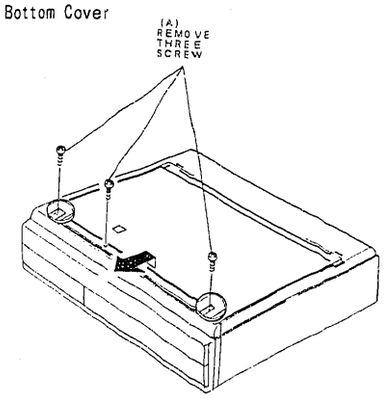


Fig. 5-2 (For VT-M251A, AW)

3. Front Panel

* Components to remove first
1) Top Cover (Item 5-1)
2) Bottom Cover (Item 5-2)

(Caution when reinstalling)
- Reinstall the front panel while the cassette door is pushed in halfway, so that the boss of door actuating arm can be positively engaged with the recess on the side of the door as shown below.

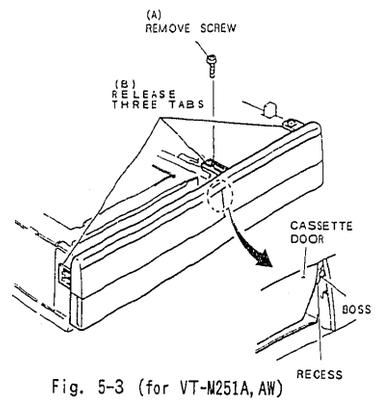


Fig. 5-3 (for VT-M251A, AW)

4. Cassette Door

* Components to remove first
1) Front Panel (Item 5-3)

(Caution when reinstalling)
- Attach the spring at the right of the cassette door firmly.

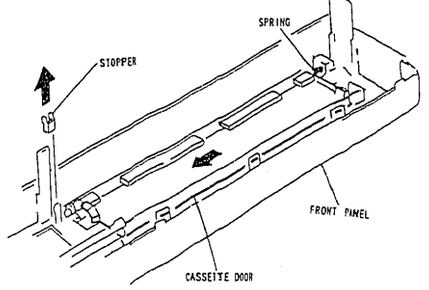


Fig. 5-4 (For VT-M251A, AW)

5. Rear Panel

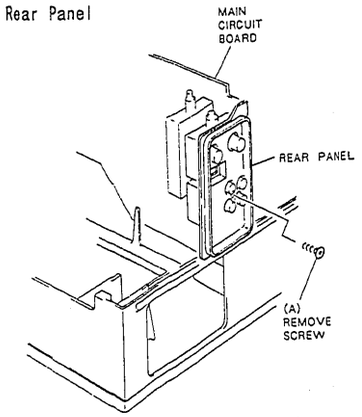


Fig. 5-5 (For VT-M251A, AW)

Be sure to remove the cases when servicing and checking the circuit boards.
- Top Cover (see item 5-1)
- Bottom Cover (see item 5-2)
- Front Panel (see item 5-3)

6. CIRCUIT BOARD REMOVAL (For VT-M251A, AW)

1. Function SW, Front Jack Circuit Board

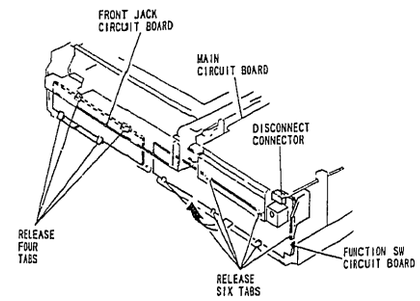


Fig. 6-1 (For VT-M251A, AW)

2. Main Circuit Board

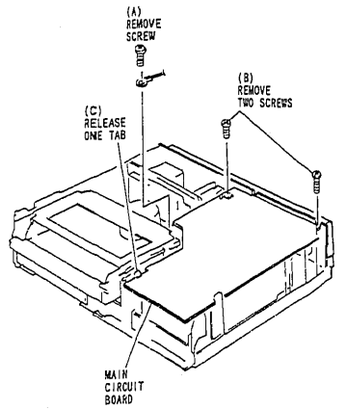


Fig. 6-2 (For VT-M251A, AW)

3. Luminance/Chroma Circuit Board

(Before removing)
1) Remove the main circuit board. (See item 6-2)

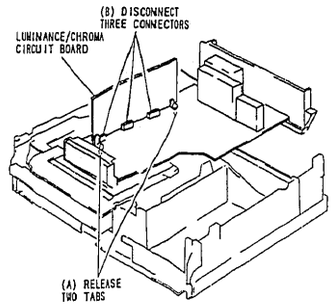


Fig. 6-3 (For VT-M251A, AW)

4. Power Supply Circuit Board
5. Pre-Amp/Head SW Circuit Board

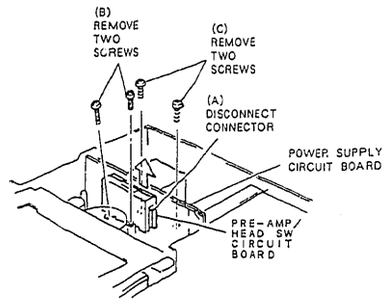


Fig. 6-4 (For VT-M251A, AW)

6. Sensor Circuit Board

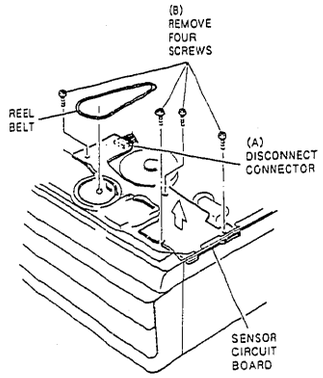
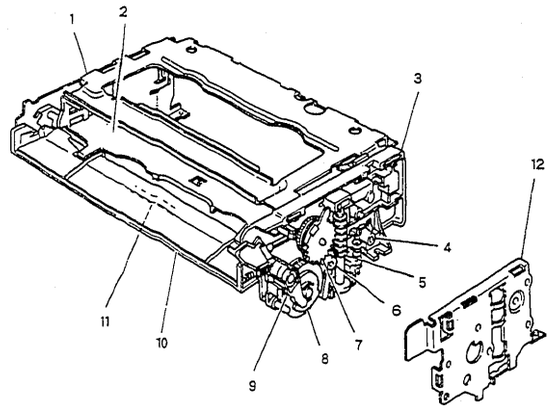


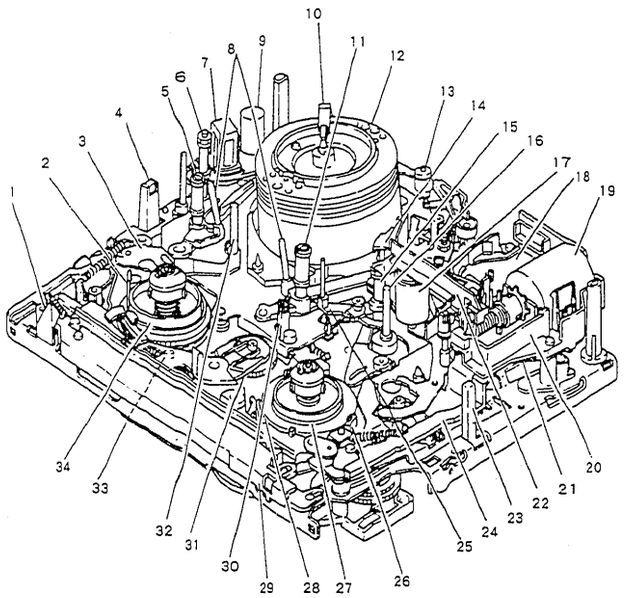
Fig. 6-5 (For VT-M251A, AW)

7. IDENTIFICATIONS AND LOCATIONS OF MAIN MECHANICAL COMPONENTS



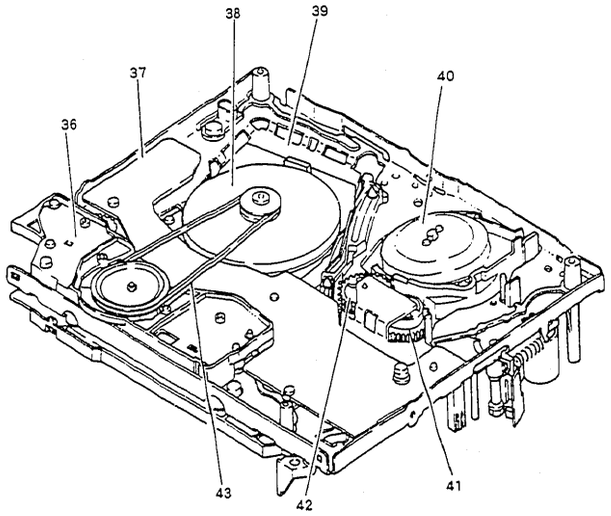
1. Chassis Holder
2. Cassette Holder
3. Gear Bracket
4. Switch Lever (B)
5. FL Worm Gear
6. Switch Lever (A)
7. Worm Wheel
8. Drive Gear
9. Door Arm
10. Front Holder
11. Shaft Pin
12. Side Chassis

Fig. 7-1 Cassette Loading Mechanism



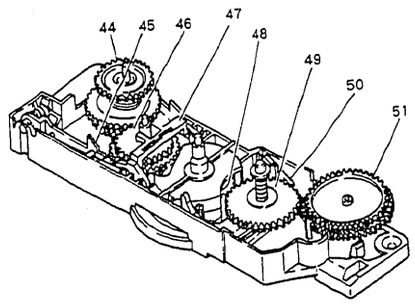
1. Safety Arm
2. Tension Band
3. Tension Arm
4. Supply End Sensor
5. Supply Guide Roller
6. Supply Guide Pole
7. Full Erase (FE) Head
8. Inclined Guides
9. Impedance Roller
10. Ground Brush
11. Take-up Guide Roller
12. Cylinder (Video Heads)
13. Auto Head Cleaning Mechanism
14. Audio/Control (A/C) Head
15. Take-up Guide Pole
16. Capstan Shaft
17. Pressure Roller
18. Mechanism State Switch
19. Loading Motor
20. Loading Motor Holder
21. Load Bracket Assembly
22. Cassette Lid Opener
23. Take-up End Sensor
24. Brake Link Arm
25. Half Loading Arm Assembly
26. Take-up Brake
27. Take-up Reel Disk
28. Take-up Main Brake
29. Slider Block
30. End Lamp
31. Reel Drive Idler
32. Tension Pole
33. Supply Main Brake
34. Supply Reel Disk

Fig. 7-2 Top View of Mechanism



36. Clutch Gear Assembly
37. Sensor P.C.B
38. Capstan Motor
39. Capstan Motor P.C.B
40. Cylinder Motor
41. Supply Loading Gear
42. Take-up Loading Gear
43. Reel Belt

Fig. 7-3 Bottom View of Mechanism



44. Take-up Gear
45. Clutch Arm
46. Change Arm
47. Change Gear
48. Take-up Pulley
49. FL Change Gear
50. FL Change Arm
51. Relay Gear

Fig. 7-4 Clutch Gear Assembly

Refer to the VT-M150A / M151A,AW service manual (No. 3472E) for the removal of the mechanical components.

CHAPTER 3

ELECTRIC CIRCUIT ADJUSTMENT

Test equipment and tapes necessary for adjustment

1) Dual-trace oscilloscope
2) Color bar generator
3) VTVM
4) DC voltmeter
5) Frequency counter
6) Monitor TV (with A/V jacks)
7) Alignment tapes
   - MH-1 : Parts No. 7099046
   - 30HMP2-1 : Parts No. 7099089
8) Blank tape

Cautions on adjustments

1) If there are no special instructions, the following conditions apply.
   - Oscilloscope probe: 10:1
   - Oscilloscope synchronization: Internal sync
   - Ground of test equipment: TP602 (GND) on Main P.C.B
2) When making more than one adjustment, perform the adjustments in the order listed.

Servicing positions

The circuit boards can be set to the servicing positions as follows when servicing and adjusting the VCR.

Fig. 1 (For VT-M250A)

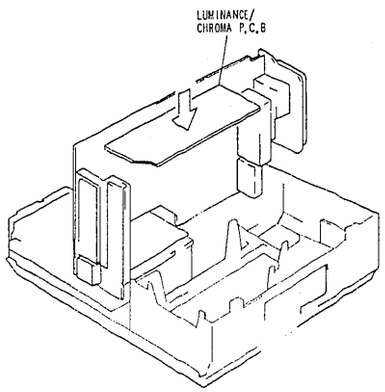


Fig. 2 (For VT-M250A)

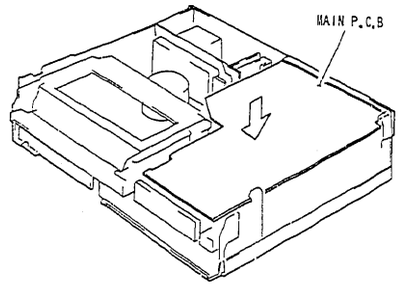


Fig. 3 (For VT-M251A, AW)

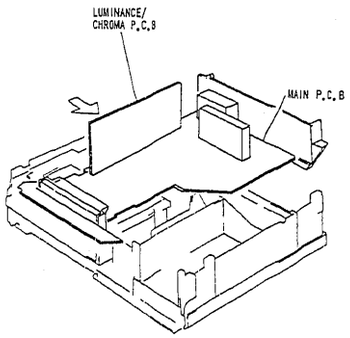


Fig. 4 (For VT-M251A, AW)

Usable servicing methods

1. To reset the microprocessor
   The microprocessors used in this unit can be reset by pressing switch(S1771) on the Function SW circuit board.

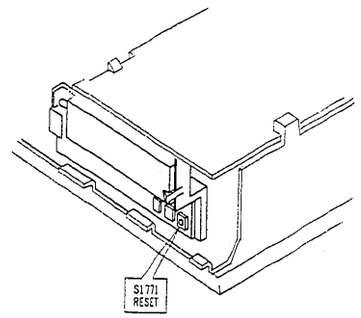


Fig. 5 (For VT-M250A)

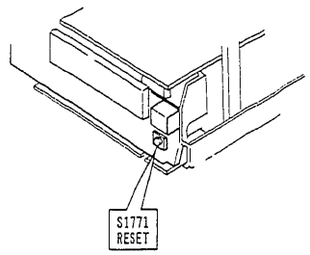


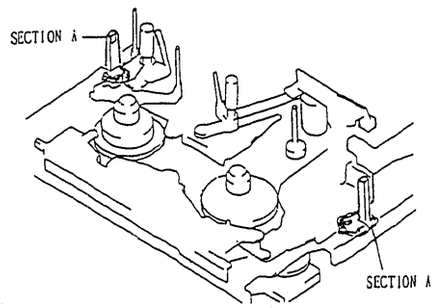
Fig. 6 (For VT-M251A, AW)

2. To set the VCR to the loading state without loading a cassette

1) Unplug the power cord from the AC outlet.
2) Cover the supply and take-up end sensors (sections A in the figure below) with black masking tape, etc. to shut off the light.
3) Plug the power cord into an AC outlet.
4) Turn the VCR on.
   The VCR can accept the inputs of each mode in this state. However, the rewind operation cannot be performed for more than a few seconds because the take-up reel disk is in the stop state and reel pulses cannot be detected.

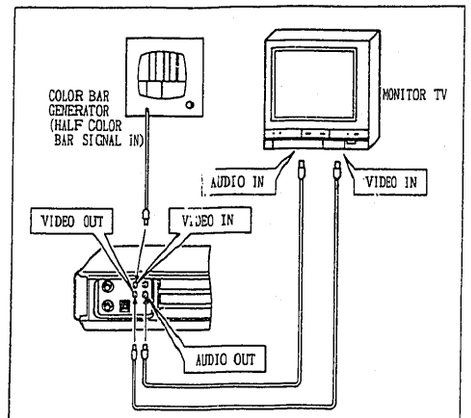
[Cautions]
Always return the VCR to the original state in the following order after the above operations have been completed.

1) Remove the masking tape, etc. from the supply and take-up end sensors.
2) Unplug the power cord from the AC outlet once to reset the system control microprocessor.



3. To set the tracking to the center
   If Tracking : Center is specified, press the TRACKING UP(▲) and DOWN(▼) buttons simultaneously to set tracking to the center.

4. Test equipment connection
・ Connect test equipment as shown when not otherwise specified.



Setting the conditions of VCR
(1) Set to the external input mode.

Adjustment Parts Locations

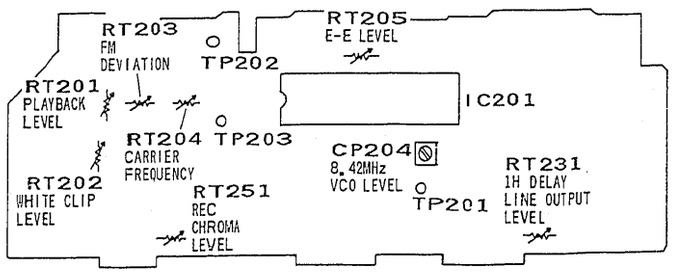


Fig. 1 Luminance/Chroma Circuit Board (Component Side) [For VT-M250A]

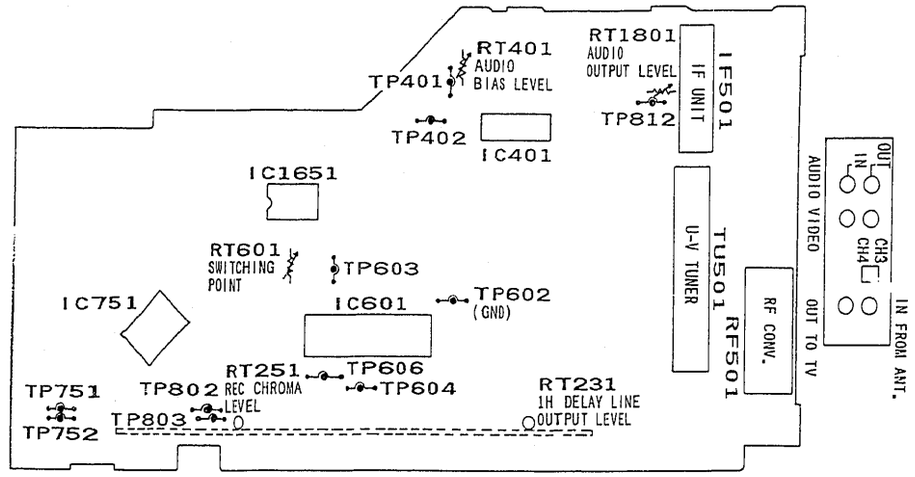


Fig. 2 Main Circuit Board (Solder Side) [For VT-M250A]

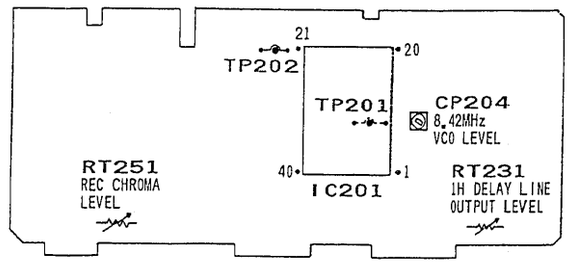


Fig. 3 Luminance/Chroma Circuit Board (Component Side) [For VT-M251A, AW]

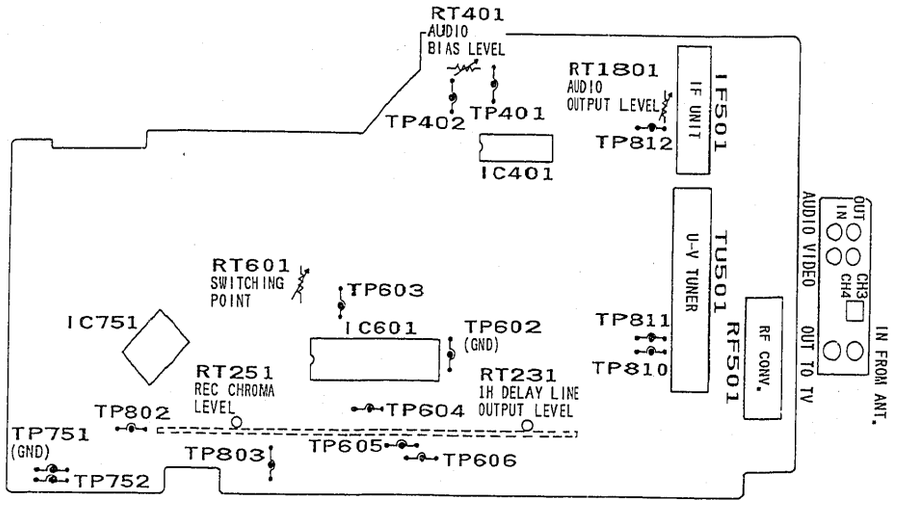


Fig. 4 Main Circuit Board (Solder Side)
[For VT-M251A, AW]

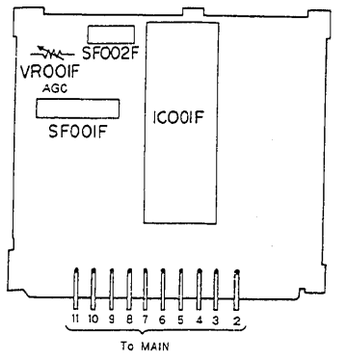


Fig. 5 IF Circuit Board (Component Side)

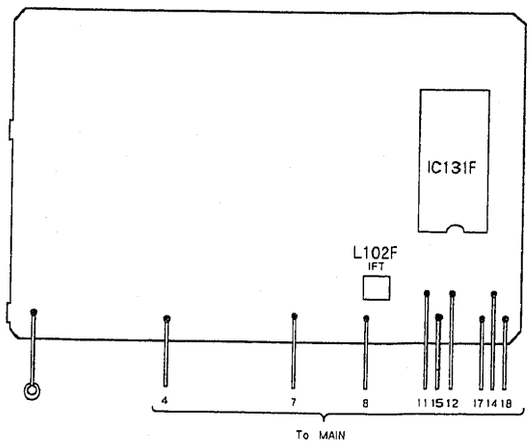


Fig. 6 U-V Tuner Circuit Board
(Component Side)

1. SERVO CIRCUIT ADJUSTMENT

1. Head Switching Point Adjustment

Purpose of adjustment and fault occurring if incomplete

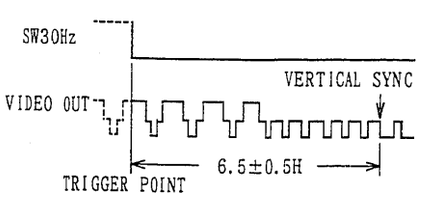
Purpose: To set the video head switching point during play to approximately the center where the CH-1 and CH-2 envelopes overlap each other.

Fault:
- The vertical sync signal is degraded and vertical jitter occurs.
- Switching noise appears across the bottom of the screen.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
• Oscilloscope • Alignment tape (MH-1) (Parts No.7099046)	• CH-1: VIDEO OUT • CH-2: TP606[VT-M250A] TP605[VT-M251A] (SW30Hz)	• Play alignment tape (color bar signal)	• RT601 (SWITCHING POINT)

Adjustment Procedure
Vertical sync signal:
Set to 6.5H±0.5H from the trailing edge (trigger position) of the SW30Hz pulse.
<Settings of oscilloscope>
- Trigger with CH-2.
- Set the sync slope to "+".

Waveforms



2. Vertical Jitter Correction

Purpose of adjustment and fault occurring if incomplete

Purpose: To Suppress vertical jitter during slow motion and still play.

Fault: Vertical jitter occurs in the picture during slow motion and still play.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
• Color bar generator • Monitor TV • Blank tape	• VIDEO IN • Check with monitor TV	• Record color bar signal and play it back with the same VCR.	• TRACKING UP (Remote control) • TRACKING DOWN (Remote control)

Adjustment Procedure
- EP V. jitter correction -
Record in the EP mode and play back in the still mode with the same VCR.
1) Press the PAUSE button of the VCR to set it to the still play mode.
2) Suppress vertical jitter in the picture.

- SP V. jitter correction -
Record in the SP mode and play back in the still mode with the same VCR.
1) Press the PAUSE button of the VCR to set it to the still play mode.
2) Suppress vertical jitter in the picture.

3. Slow Tracking Preset Adjustment

Purpose of adjustment and fault occurring if incomplete

Purpose: To adjust the timing with which brake pulses are generated for the capstan motor during slow play and minimize noise.

Fault:

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
• Color bar generator • Monitor TV • Blank tape	• VIDEO IN • Check with monitor TV	• Unplug the power cord from AC outlet to set slow tracking to the center.	• TRACKING UP (Remote control) • TRACKING DOWN (Remote control)

Adjustment Procedure
- EP Adjustment -
Record in the EP mode and play back with the same VCR.
1) Play back the recorded section in the slow mode.
2) Observing the monitor screen, move noise to the top of the screen.

- SP Adjustment -
Record in the SP mode and play back with the same VCR.
1) Play back the recorded section in the slow mode.
2) Observing the monitor screen, move noise to the top of the screen.

2. VIDEO CIRCUIT ADJUSTMENTS

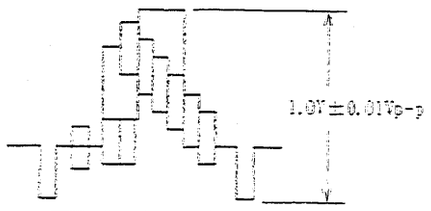
1. E-E Level Adjustment (VT-M250A Only)

Purpose of adjustment and fault occurring if incomplete
Purpose: Set the luminance level to the specified value in the E-E mode.
Fault: The brightness is different between the input and output signals.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
• Color bar generator • Oscilloscope (200mV/div., 10us/div.)	• VIDEO IN • VIDEO OUT	• Apply a color bar signal and set the VCR to the E-E mode.	• RT305 (E-E LEVEL)

Adjustment Procedure
1) Adjust RT305 so that the color bar level is 1.0Vp-p±0.01Vp-p. (75Ω Terminated)

Waveforms



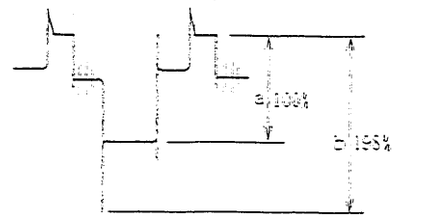
2. White Clip Level Adjustment (VT-M250A Only)

Purpose of adjustment and fault occurring if incomplete
Purpose:
Fault:

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
• Oscilloscope (200mV/div., 10 us/div.) • Color bar generator	• IC-1: TP208 • VIDEO IN	• Apply a color bar signal and set the VCR to the E-E mode.	• RT202 (WHITE CLIP LEVEL)

Adjustment Procedure
1) Adjust RT202 so the relationship between levels (a) and (b) is obtained as shown in the diagram on the right.

Waveforms



b=95%+3% /-5%

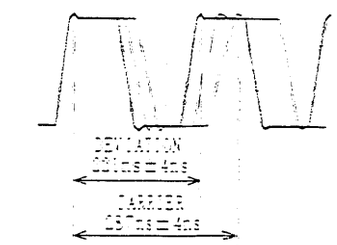
3. FM Carrier and Deviation Adjustment (VT-M250A Only)

Purpose of adjustment and fault occurring if incomplete
Purpose: Sets the FM carrier frequency and deviation to the specified values.
Fault: The picture is distorted when tapes recorded by other VCRs are played by this VCR and compatibility is not obtained.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Points
• Color bar generator • Oscilloscope • Blank tape	• VIDEO IN • TP301 Pin 13	• Receive a white(100% signal (line input) • REC mode • EP mode	• RT204 (Carrier Frequency) • RT206 FM Deviation

Adjustment Procedure
1) Connect an oscilloscope to TP301-pin13.
2) Set the scope to H and adjust the RT204 so the period of the widest pulse is 287ns±4ns.
3) Set the scope to H and adjust the RT206 so the period of the narrowest pulse is 221ns±4ns.

Waveforms



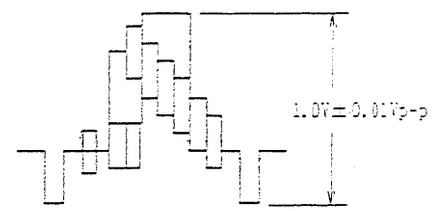
4. Playback Level Adjustemnt (VT-M250A Only)

Purpose of adjustment and fault occurring if incomplete
Purpose: To set the playback level to the specified value.
Fault: The brightness of the picture during playback is different from that during recording.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
• Color bar generator • Oscilloscope • Blank tape	• VIDEO IN • VIDEO OUT	• Receive a color bar signal (line input) • REC mode • EP mode	• RT201 (PLAYBACK LEVEL)

Adjustment Procedure
1) Playback the recorded signal and adjust RT201 so that the color bar level is 1.0Vp-p±0.01Vp-p. (75Ω Terminated)

Waveforms



5. 8.42MHz VCO Level Adjustment

Purpose of adjustment and fault occurring if incomplete
Purpose: To set the VCO oscillation frequency.
Fault: Colors are displaced or color disappears.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
• Color bar generator • DC Voltmeter	• VIDEO IN • TP301	• Receive a color bar signal (line input) (E-E mode)	• CP204 (8.42MHz VCO LEVEL)

Adjustment Procedure
1) Adjust CP204 so the DC level is 2.65±0.05V.

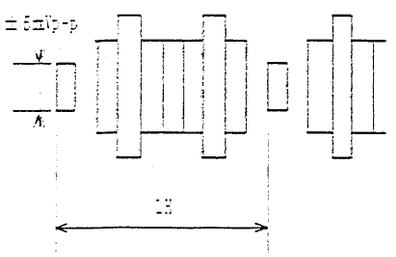
6. Record Chroma Level Adjustment

Purpose of adjustment and fault occurring if incomplete
Purpose: To set the record chroma level to an optimum value.
Fault: Beats may occur or the color may become poor.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Points
• Color bar generator • Oscilloscope • Blank tape	• VIDEO IN • TP308 REC (CHROMA)	• Receive a color bar signal (line input) • REC mode • EP mode	• RT251 (REC CHROMA LEVEL)

Adjustment Procedure
1) Adjust RT251 so that the color burst level is 105±5mVp-p.

Waveforms



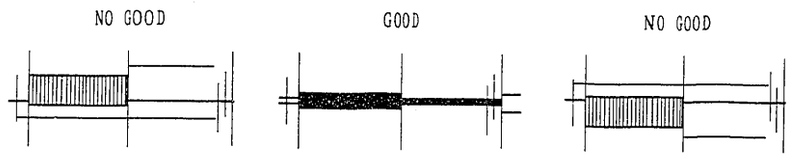
7. 1H Delay Line Output Level Adjustment

Purpose of adjustment and fault occurring if incomplete
Purpose: To set the input and output levels of the CCD 1H DELAY LINE the same.
Fault: Switching noise is conspicuous when dropout is compensated.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
· Oscilloscope · Alignment tape (MH-1) (Parts No.7099046)	· CH-1: TP202 · CH-2: TP606 (VT-M250A) TP605 (VT-M251A) (SW30Hz)	· Play alignment tape (Color bar signal)	· RT231 (1H DELAY LINE OUTPUT LEVEL)

Adjustment Procedure
1) Adjust RT231 to minimize level at the waveform.

Waveforms



3. AUDIO CIRCUIT ADJUSTMENT

1. Audio Bias Level Adjusyment

Purpose of adjustment and fault occurring if incomplete
Purpose: To set the recording bias to the optimum level.
Fault: · Bias too high : High-frequency response deteriorates.
· Bias too low : Sound tends to be distorted.

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Points
· VTVM	· TP401 (REC BIAS) · TP402 (BIAS GROUND)	· No-signal record mode (SP mode)	· RT401 (AUDIO BIAS LEVEL)

Adjustment Procedure
1) Reading of VTVM : 2.6mV±0.1mVrms

2. Audio Output Level Adjustment (VT-M250A Only)

Purpose of adjustment and fault occurring if incomplete
Purpose: To matches the audio level of the VCR mode to the level of the TV mode.
Fault:

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
· Antenna Terminal · Monitor TV	· VHF IN · VHF OUT	· Tune the TV to a local broadcast channel	· RT1801 (AUDIO OUTPUT LEVEL)

Adjustment Procedure
1) Set the VCR/TV select switch to TV.
2) Set the TV volume control to a normal listening level.
3) Set the VCR/TV select switch to VCR and tune the VCR tuner to the same channel as that used in step 2.
4) Tune the TV to channel 3 and adjust the RT1801 so that it matches the level observed in step 2.

4. IF/TUNER CIRCUIT ADJUSTMENT

1. AGC Adjustment

Purpose of adjustment and fault occurring if incomplete
Purpose: The AGC adjustment determines the point where the AGC is activated.
Fault:

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Points
· RF NTSC color bar generator · DC Voltmeter	· VHF IN · U-V TUNER 6 (AGC)	· Receive a color bar signal.(RF input)	· VR001F (AGC)

Adjustment Procedure
1) Set the VCR/TV select switch to VCR.
2) Supply a 199.25MHz/-43dBm RF NTSC color bar signal with 87.5% modulation to the VHF antenna terminal.
3) Tune in the RF channel supplied by the NTSC color bar generator (select channel 11).
4) Adjust VR001F for 5.1±0.1V DC.

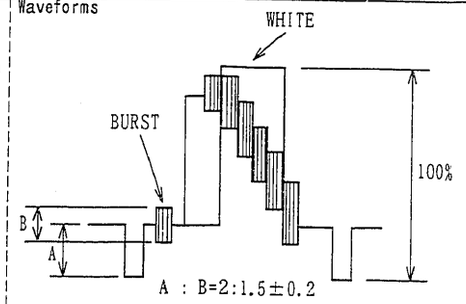
2. IFT Adjustment

Purpose of adjustment and fault occurring if incomplete
Purpose: To set the chroma level to the specified value.
Fault:

Test Equipment/Jigs	Test Equipment Connection Points	VCR State	Adjustment Point
· RF NTSC color bar generator · Oscilloscope	· VHF IN · IF UNIT-2 (VIDEO)	· Receive a color bar signal.(RF input)	· IFT

Adjustment Procedure
1) Set the VCR/TV select switch to VCR.
2) Supply a 199.25MHz/-43dBm RF NTSC color bar signal with 87.5% modulation to the VHF antenna terminal.
3) Tune in the RF channel supplied by the NTSC color bar generator (select channel 11).
4) Adjust the core of the IFT so the ratio between SYNC level (A) and burst level (B) is 2 : 1.5 .
(Note: Check that the yellow level of the chroma signal does not exceed the 100% white level. If it does, readjust the core.)

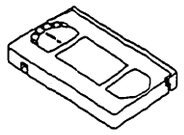
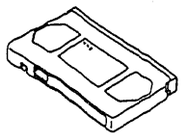
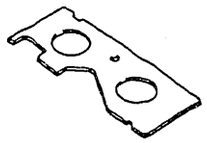
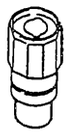
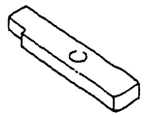
Waveforms



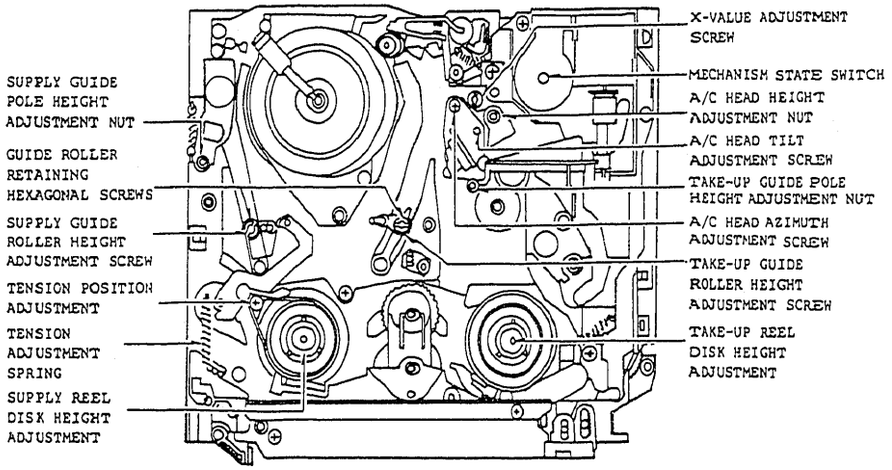
CHAPTER 4

MECHANISM ADJUSTMENT

JIGS AND TAPES FOR ADJUSTMENT

1. Back Tension Meter Parts No. 7099004 	2. Alignment Tape - MH-1 - Parts No. 7099046 - 30HMP2-1 - Parts No. 7099089 	3. Master Plane Parts No. 7099279 
4. Torque Gauge Parts No. 7099039 	5. Torque Gauge Adapter Parts No. 7099035	6. Reel Disk Height Jig Parts No. 7099038 
7. 1.5mm Hexagonal Wrench 0.9mm Hexagonal Wrench		

ADJUSTMENT PARTS LOCATIONS


SUPPLY GUIDE POLE HEIGHT ADJUSTMENT NUT
GUIDE ROLLER RETAINING HEXAGONAL SCREWS
SUPPLY GUIDE ROLLER HEIGHT ADJUSTMENT SCREW
TENSION POSITION ADJUSTMENT
TENSION ADJUSTMENT SPRING
SUPPLY REEL DISK HEIGHT ADJUSTMENT
X-VALUE ADJUSTMENT SCREW
MECHANISM STATE SWITCH
A/C HEAD HEIGHT ADJUSTMENT NUT
A/C HEAD TILT ADJUSTMENT SCREW
TAKE-UP GUIDE POLE HEIGHT ADJUSTMENT NUT
A/C HEAD AZIMUTH ADJUSTMENT SCREW
TAKE-UP GUIDE ROLLER HEIGHT ADJUSTMENT SCREW
TAKE-UP REEL DISK HEIGHT ADJUSTMENT

Top View of Mechanism

MECHANICAL PARTS ADJUSTMENT

1. Mechanism State Switch Adjustment

Purpose: To detect the mechanism state correctly and prevent malfunctions.

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Blank tape	——	· Eject mode (with the cassette ejected)	· Mechanism state switch · Mode gear

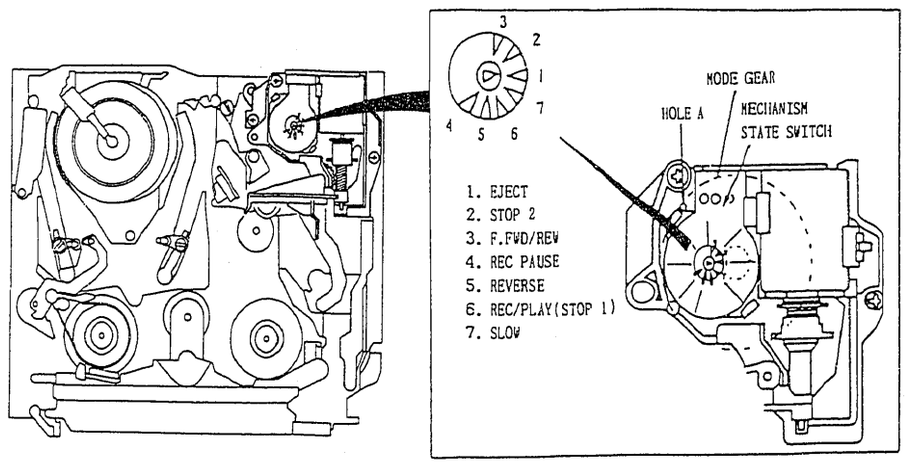
Adjustment procedure

1) Check that the arrow on the center shaft of the mechanism state switch points to the arrow of mechanism mode indication number 1. Also check that hole (A) beside the mechanism state switch and the hole in the mode gear are aligned.

2) If the above alignments are not obtained, adjust as follows.
   1. Remove the mechanism state switch/loading motor assembly.
      (See "MAIN MECHANICAL COMPONENTS REMOVAL" in CHAPTER 2.)
   2. Move the mode gear to align the position of hole (A).
   3. Turn the gear on the back of the mechanism state switch so that the arrow on the center shaft of the switch points to the arrow of mechanism mode indication number 1.
   4. Reinstall the mechanism state switch/loading motor assembly in the above condition.

3) Load a blank tape and perform various operations to check that loading and unloading are performed correctly.

Adjustment diagram



TAPE TRANSPORT SYSTEM PARTS ADJUSTMENT

The tape transport system is the path from the supply reel disk passing through the video heads to the take-up reel disk. The transport system parts, especially the parts which directly come into contact with a tape, should be kept clean without scratches, dust, oil, etc.
The tape transport system has been adjusted before the unit is shipped from the factory. Therefore, when parts in the transport system are replaced, the transport system is stabilized by only adjusting the new parts correctly.

1. Reel Disk Height Adjustment

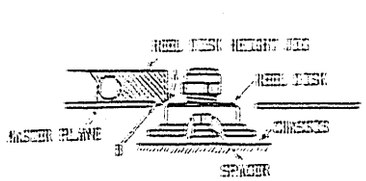
Purpose: To set the reels of the cassette to the specified height, thus determining the height of tape.

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
- Master plane (Parts No. 7099279) - Reel disk height jig (Parts No. 7099036)	1) Remove the cassette loading mechanism. 2) Mount the master plane and place the reel disk height jig on it.	——	- Spacers in the supply and take-up reel disks

Adjustment procedure
1) Check that the reel disk is between sections A and B of the reel disk height jig.
2) If the disk is not between sections A and B of the jig, replace the spacer (1.5mm thick) in the reel disk or adjust them.

[Caution]
When the tension arm and tension band are removed, adjust the tension pole position and tension after reassembling them.

Adjustment diagram



2. Tension Pole Position and Tension Adjustment

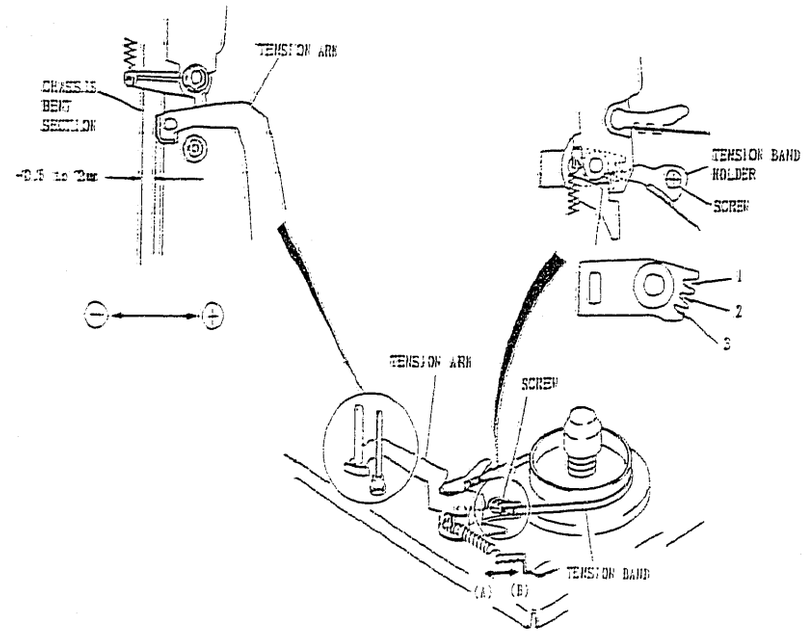
Purpose: To make the tension of tape constant so that the contact between the video heads and tape is stabilized.

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
Position adjustment ——	——	1) Remove the top cover. 2) Set the VCR to the loading state without inserting a cassette. (See page 4-12)	Position adjustment: Tension band holder
Tension adjustment - Back Tension Meter (Parts No. 7099004)	——	Tension adjustment 3) Play the tension cassette.	Tension adjustment: Tension spring hooking position

Adjustment procedure
- Position Adjustment -
1) Loosen the tension band retaining screw.
2) Insert the tension band holder into one of grooves 1 to 3 and set the gap between the tension pole and chassis to −0.5 to 2mm.
3) Tighten the tension band retaining screw.
4) After adjustment is completed, perform loading without inserting a cassette and recheck the tension pole position.

- Tension Adjustment -
Reading of Back Tension Meter: 34 to 44 g-cm (reference value)
If the reading is higher than the reference, move the spring in direction (A).
If the reading is lower than the reference, move the spring in direction (B).
Caution: When the tension position is changed greatly (more than 6 g-cm), recheck the tension pole position. If it is drifted, readjust the tension pole position and tension.

Adjustment diagram



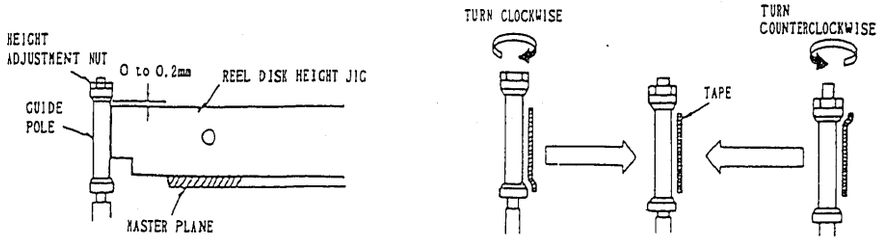
3. Guide Pole Height Adjustment

Purpose: To regulate the tape height.

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Master plane (Parts No.7099279) · Reel disk height jig (Parts No.7099038)	1) Remove the cassette loading mechanism. 2) Mount the master plane and place the reel disk height jig on it.	——	· Nuts on the supply and take-up guide poles
· Blank tape	——	· Playback mode	

Adjustment procedure
1) Set the clearance between the bottom of the guide pole's upper flange and top of the reel disk height jig is 0 to 0.2mm.
2) Load a blank tape to run it and check that the tape does not ride over the upper and lower flanges of the guide pole.
3) If the tape rides over either flange, adjust the height of guide pole as follows.
If the tape rides over the upper flange, turn the nut counterclockwise.
If the tape rides over the lower flange, turn the nut clockwise.

Adjustment diagram



4. Guide Roller Height Adjustment

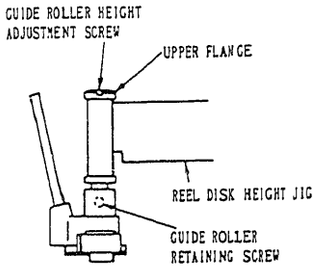
Purpose: To regulate the height of tape so that the bottom of tape runs along the tape guide line on the cylinder.

Coarse Adjustment

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Master plane (Parts No.7099279) · Reel disk height jig (Parts No.7099038) · 0.9mm Hexagonal wrench	1) Remove the cassette loading mechanism. 2) Mount the master plane and place the reel disk height jig on it.	——	Height adjustment screws on the supply and take-up guide rollers

Adjustment procedure
1) Loosen the guide roller retaining screw (so that the guide roller does not turn during loading, unloading and play).
2) Align the bottom of the guide roller's upper flange and the top of the reel disk height jig.
3) Perform the precise adjustment continuously.

Adjustment diagram

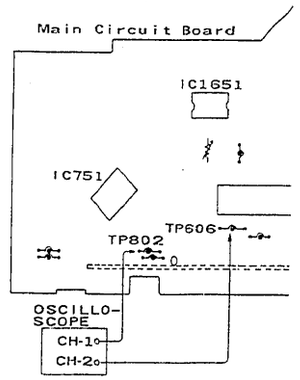


Precise Adjustment

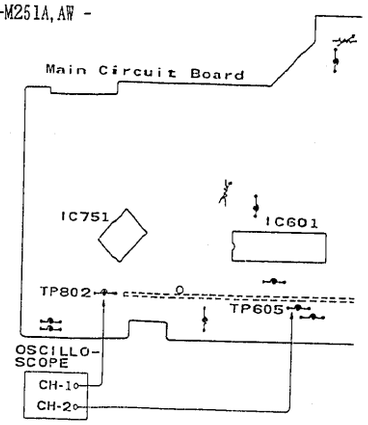
Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Oscilloscope · Alignment tape (30HMP2-1) (Parts No.7099089) · 0.9mm Hexagonal wrench	· CH-1: TP802 (PB FM) · CH-2: TP606 (VT-M250A) TP605 (VT-M251A) (SW30Hz)	· Play alignment tape (Color bars section)	· Guide roller height adjustment screws

Connection diagram

- VT-M250A -

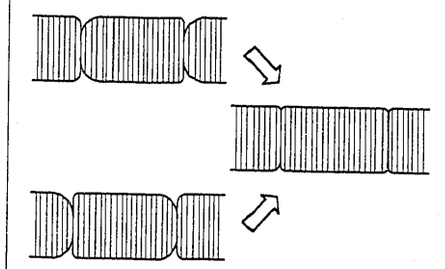


- VT-M251A,AW -

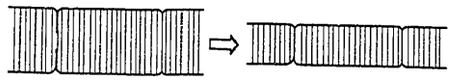


Adjustment procedure
1) Tracking control (playback) : Center position (when this adjustment is performed after the cylinder has been replaced, set the tracking control so that the FM output is maximum.)
2) Connect TP751 and TP603 on the main board. Short circuit between TP751 and TP752 on the main board for 2 seconds, and remove the short circuit.By this, the digitron is entered the test mode, and "◁◁ ▷▷" is displayed.
3) Height adjustment screw : Flatten the FM envelope.
4) Press the tracking control up and down buttons.
5) Check that the FM drops at the start and end of FM envelope are uniform.
6) Tighten the guide roller retaining screw.
7) Remove the jumper and reshort circuit between TP751 and TP752 for 2 seconds, and remove the short circuit.

Waveforms



Turn the guide roller height adjustment screw slightly to flatten the waveform.



Tracking control at center

Press the tracking control buttons.

5. Audio / Control (A/C) Head Adjustment

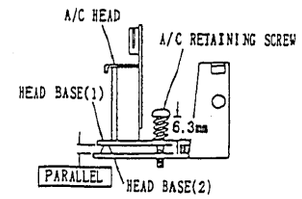
Purpose: To keep the contact between the tape and head even so the specified track is recorded and played back.

Coarse Adjustment

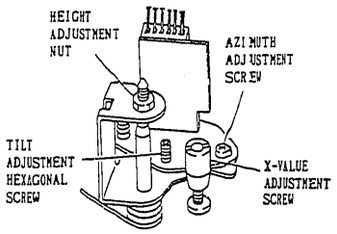
Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Master plane (Parts No.7099279) · Reel disk height jig (Parts No.7099038) · 1.5mm Hexagonal wrench	1) Remove the cassette loading mechanism. 2) Mount the master plane and place the reel disk height jig on it.	——	· A/C head retaining screw · Azimuth adjustment screw · Height adjustment nut · Tilt adjustment screw
· Blank tape	——	· Run the blank tape.	

Adjustment procedure/adjustment diagrams

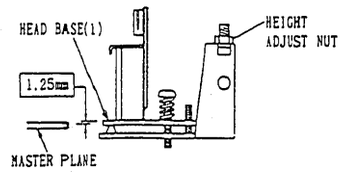
1) A/C head retaining screw: Check that the spring section of the A/C head retaining screw protrudes 6.3mm over the top of head base (1).



2) Tilt adjustment hexagonal screw, azimuth adjustment screw: Make head bases (1) and (2) parallel.

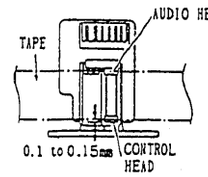


3) Height adjustment nut: Set the clearance between the master plane and head base (1) to approx. 1.25mm.



4) Remove the adjustment jigs, load a blank tape and set the VCR to the play mode.

5) Check that there is no conspicuous curling and riding over around the A/C head. If there is conspicuous curling or riding over, readjust the tilt adjustment hexagonal screw, azimuth adjustment screw and height adjustment nut. When the bottom edge of tape is 0.1 to 0.15mm from the bottom edge of the control head's core, the height of A/C head is ideal.



6) Perform the precise adjustment continuously.

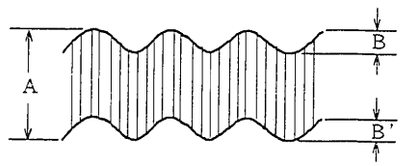
Precise Adjustment

Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Oscilloscope	· AUDIO OUT jack	· Play alignment tape (7KHz section if MH-1 alignment tape is used)	· Azimuth adjustment screw · Height adjustment nut · Tilt adjustment screw
· Alignment tapes (Parts No. 7099046) (Parts No. 7099089)	——		
· 1.5mm Hexagonal wrench			

Adjustment procedure

1) Adjust the azimuth adjustment screw, height adjustment nut and tilt adjustment hexagonal screw slightly and alternately: Make the audio output maximum and flat (minimum fluctuations).

Waveform diagram



A: Maximum B B': Minimum

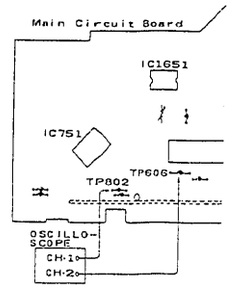
6. X Value Adjustment

Purpose: To obtain compatibility with other VCRs.

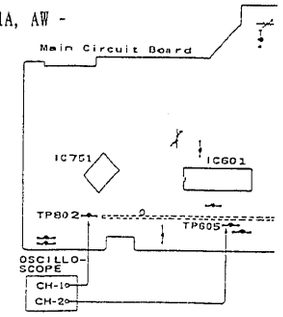
Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Oscilloscope	· CH-1: TP802 (PB FM) · CH-2: TP606 (VT-M250A) TP605 (VT-M251A) (SW30Hz)	· Play alignment tape (Step waveform if MH-1 alignment tape is used)	· X value adjustment screw
· Alignment tapes (Parts No. 7099046) (Parts No. 7099089)	——		
· 1.5mm Hexagonal wrench			

Connection diagram

- VT-M250A -



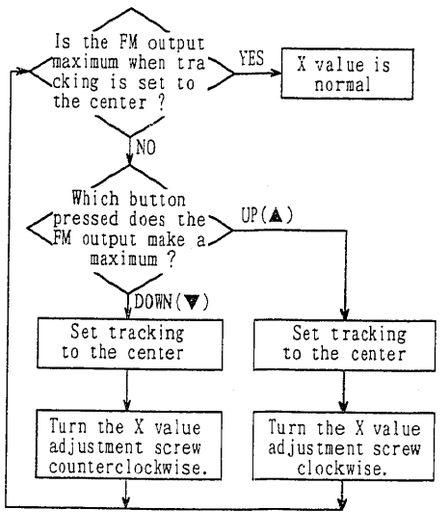
- VT-M251A, AW -



Adjustment procedure

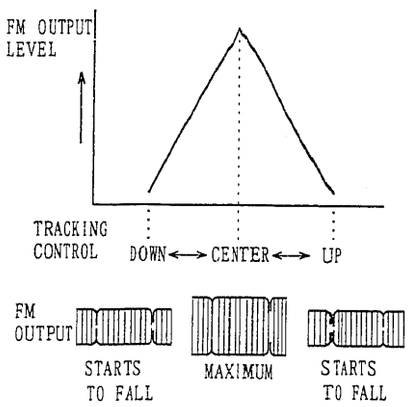
(Adjustment using 30HMP2-1 alignment tape)

Connect TP751 and TP603 on the main circuit board. Short circuit between TP751 and TP752 on the main board for 2 seconds, and remove the short circuit. By this, the digitron is entered the test mode, and "◁◁ ▷▷" is displayed.


Is the FM output maximum when tracking is set to the center ?
YES
X value is normal
NO
Which button pressed does the FM output make a maximum ?
UP(▲)
DOWN(▼)
Set tracking to the center
Set tracking to the center
Turn the X value adjustment screw counterclockwise.
Turn the X value adjustment screw clockwise.

To set the tracking to the center

Press the TRACKING UP and TRACKING DOWN buttons simultaneously to set tracking to the center.



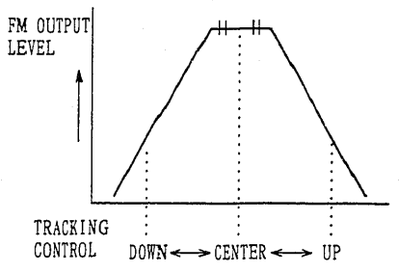
After the X-value adjustment is completed, remove the jumper and reshort circuit between TP751 and TP752 for 2 seconds, and remove the short circuit.

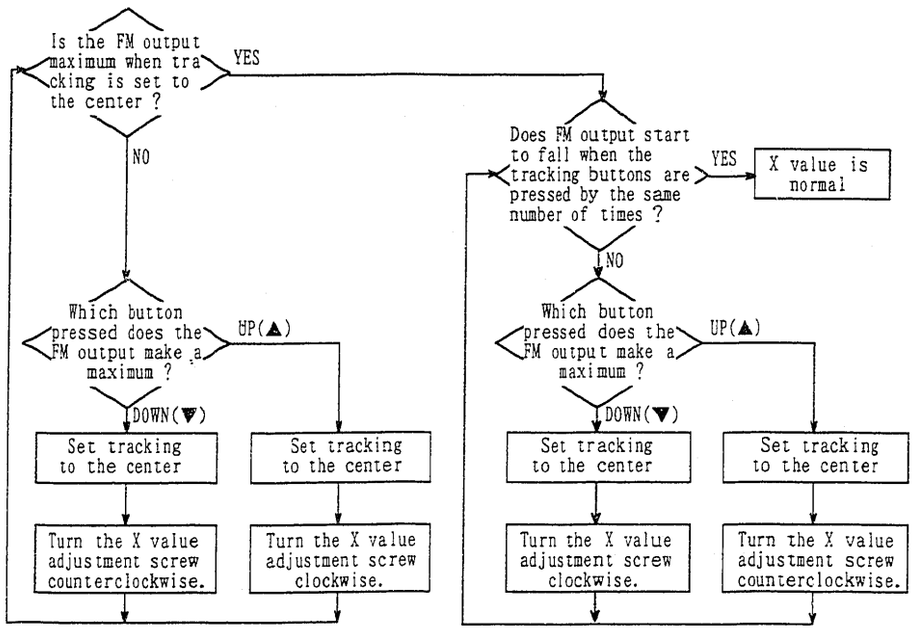
Adjustment procedure
(Adjustment using MH-1 alignment tape)
Connect TP751 and TP603 on the main circuit board. Shrt circuit between TP751 and TP752 on the main board for 2 seconds, and remove the short circuit. By this, the digitron is entered the test mode, and "◁◁ ▷▷" is displayed.

After the X-value adjustment is completed, remove the jumper and reshort circuit between TP751 and TP752 for 2 seconds, and remove the short circuit.

To set the tracking to the center
Press the TRACKING UP and TRACKING DOWN buttons simultaneously to set tracking to the center.

Adjustment diagram



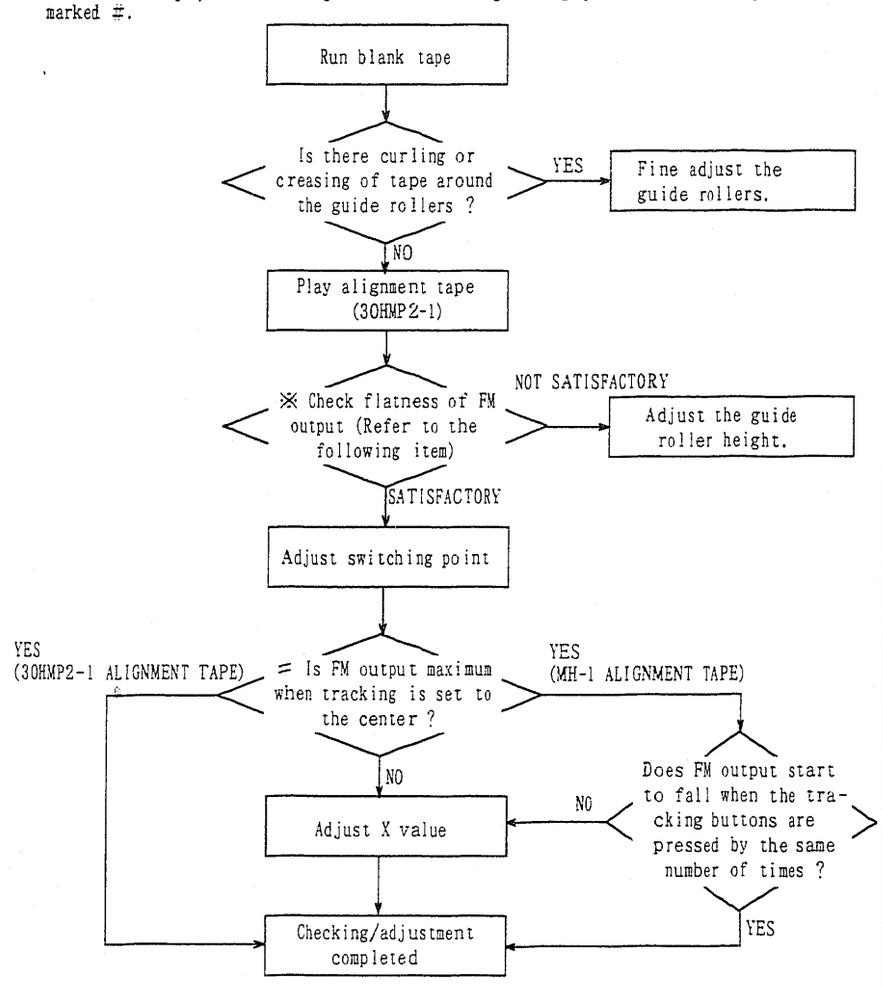

Is the FM output maximum when tracking is set to the center ?
YES
NO
Which button pressed does the FM output make a maximum ?
UP(▲)
DOWN(▼)
Set tracking to the center
Turn the X value adjustment screw counterclockwise.
Set tracking to the center
Turn the X value adjustment screw clockwise.
Does FM output start to fall when the tracking buttons are pressed by the same number of times ?
YES
X value is normal
NO
Which button pressed does the FM output make a maximum ?
UP(▲)
DOWN(▼)
Set tracking to the center
Turn the X value adjustment screw clockwise.
Set tracking to the center
Turn the X value adjustment screw counterclockwise.

7. Adjustments After Replacing Cylinder (Video Heads)

Purpose: To suppress drift in the height relative to the guide roller and to minimize the X value after replacing the cylinder.

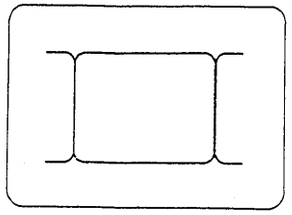
Test equipment/jig	Preparation for Adjustment	State of VCR	Adjustment points
· Oscilloscope	Checking the flatness · CH-1: TP802 (PB FM) · CH-2: TP606 (VT-M250A) TP605 (VT-M251A) (SW30Hz)	· Run the blank tape · Play alignment tape (Stairsteps section)	· Guide rollers (precise adjustment on page 4-6) · Head switching point (page 3-3) · X value (page 4-8)
· Alignment tapes (Parts No.7099046) (Parts No.7099089)			
· Blank tape			
· 0.9mm/1.5mm Hexagonal wrenches			
· X value adjustment screwdriver			

Checking/adjustment procedure
NOTE-1 : Connect test equipment referring to connection diagram on page 4-6 when checking the item marked ※.
NOTE-2 : Connect test equipment referring to connection diagram on page 4-8 when checking the item marked #.

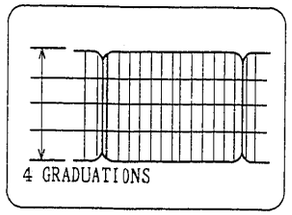

Run blank tape
Is there curling or creasing of tape around the guide rollers ?
YES
Fine adjust the guide rollers.
NO
Play alignment tape (30HMP2-1)
※ Check flatness of FM output (Refer to the following item)
NOT SATISFACTORY
Adjust the guide roller height.
SATISFACTORY
Adjust switching point
YES (30HMP2-1 ALIGNMENT TAPE)
= Is FM output maximum when tracking is set to the center ?
YES (MH-1 ALIGNMENT TAPE)
NO
Adjust X value
NO
Does FM output start to fall when the tracking buttons are pressed by the same number of times ?
YES
Checking/adjustment completed

Checking procedure of the flatness and fluctuations of FM output and waveform diagrams

1) Use the tracking control buttons to maximize the FM output.

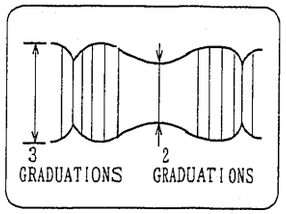


2) Fine tune the voltage level range of the oscilloscope to set the FM output to 4 graduations.



3) Press the tracking control buttons to set the maximum amplitude of the FM output to 3 graduations.

4) Check that the minimum amplitude is more than 2 graduations.



5) Check that the level fluctuations between the maximum and minimum amplitudes are less than 13%.

8. Tension/Torque Checks

Purpose: It is necessary to check the tension, torque and compression force at the tape take-up section and moving section to make the tape running smooth and satisfy the basic performance of the VCR. Check these if the tape running is not smooth or the tape speed is abnormal.

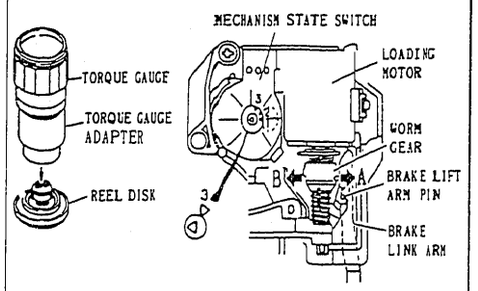
Test equipment/jigs		State of VCR	
• Torque gauge • Torque gauge adapter		• Set the VCR to each operation mode without inserting a cassette. (See page 4-11)	
Item	VTR operation mode	Measured reel	Measured value
Main brake torque	Stop (Note)	Supply & take-up reels	170 g·cm or more
Slack removal torque	Unloading	Supply reel	90 ~ 230 g·cm
Fast forward torque	Fast forward	Take-up reel	400 g·cm or more
Rewind torque	Rewind	Supply reel	400 g·cm or more
Take-up torque	Play	Take-up reel	80 ~ 170 g·cm
Back-tension torque	Fast forward	Supply reel	4 ~ 25 g·cm
	Rewind	Take-up reel	

Checking method

The values are measured using a torque gauge and torque gauge adapter with the torque gauge fixed.

Note: Turn the worm gear in the direction of arrow (A) in the stop mode and shift the pointer on the mechanism state switch to "3" so as to apply the main brake to the supply reel disk. Then turn the worm gear in the direction of arrow (B) so that brake link arm is released from the brake lift arm pin. (Set the reel drive idler to the center position.)

Adjustment diagram

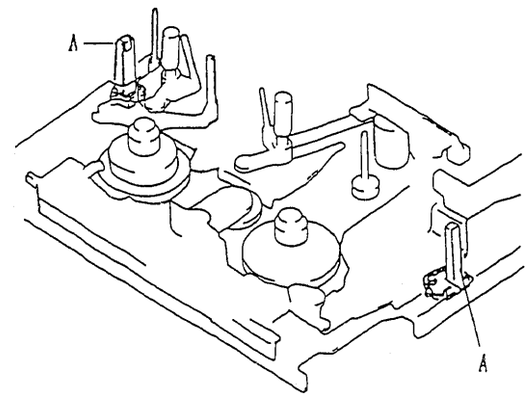


9. To Set the VCR to the Loading State without Inserting a Cassette

1) Remove the top cover and front panel.
2) Remove the cassette loading mechanism.
3) Unplug the power cord form the AC outlet.
4) Cover the supply and take-up end sensors (sections A in the figure below) with black masking tape, etc. to shut off the light.
5) Plug the power cord into the AC outlet.
6) Turn the VCR on.
The VCR can accept the inputs of each mode in this state. However, the rewind operation cannot be performed for more than a few seconds because the take-up reel disk in the stop state and reel pulses cannot be detected.

(Cautions)
Always return the VCR to the original state in the following order after the above operations have been performed.
1) Remove the masking tape, etc. from the supply and take-up end sensors.
2) Unplug the power cord from the AC outlet to reset the system control microprocessor.

Adjustment diagram



MAINTENANCE/INSPECTION PROCEDURE

1. Required Maintenance

The recording density of a VCR is much higher than that of an audio tape recorder. VCR components must be very precise, at tolerances of 1/1000 mm, to ensure compatible with other VCRs. If any of these components are worn or dirty, the symptoms will be the same as if the part is defective. To ensure a good picture, periodic inspection and maintenance, including replacement of worn-out parts and lubrications, is necessary.

2. Scheduled Maintenance

Schedules for maintenance and inspection are not fixed because they are greatly according to the way in which the customer uses the VCR, and the environment in which the VCR is used. But, in general home use, a good picture will be maintained if the inspection and maintenance is done every 1,000 hours. The table below shows the relation between time used and inspection period.

Table 1

Average hours used per day	When inspection is necessary		
	About 1 year ↓	About 18 months ↓	About 3 years ↓
One hour			
Two hours			
Three hours			

3. Check before starting Repairs

The following faults can be remedied by cleaning and oiling. Check the need for lubrication and the conditions of cleanliness in the unit. Check with the customer to find out how often the unit is used. If from that you determine that the unit is ready for inspection and maintenance, check the following parts.

Table 2

Phenomenon	Inspection Location
Poor S/N, no color	Dirt on video head or worn video head
Tape does not run or tape is slack	Dirt on pressure roller, reel belt or flywheel belt
Vertical jitter horizontal jitter	Dirt on video head or in tape transport system
Color beats	Dirt on full-erase head
Low volume or sound distorted	Dirt on audio/control head
Fast forward or rewind is not done or rotation is slow	Dirt on reel belt

4. Tools Needed for Inspection and Maintenance

(1) Head cleaning kit
(2) VCR oil kit
(3) Alcohol
(4) Gauze
(5) Screwdriver for adjusting X-value

Table 3 Locations for Greasing and Oiling using the Kit

Name	Oil or Greasing Location
Sonic Slidas Oil (#1600)	Oil low-speed rotating sections
Froil (GB-TS-1)	Lubricate metal or molded sections under light load
Lock paint	Fix adjustment screws

The above oils and greases are in the kit prepared especially for VCR maintenance. Use this kit for lubrication.

5. Maintenance Procedures

5-1 Cleaning

(1) Cleaning video head

First use a cleaning tape. If dirt on head is too stubborn to remove by tape, use the cleaning kit. Moisten the cleaning stick with cleaning fluid at the point indicated. Touch the stick to the head tip and gently turn the head (rotating cylinder) to the right and left. (Do not move the stick vertically and make sure that only the chamois leather on the stick comes into contact with the head. Otherwise, the head may be damaged.)
Thoroughly dry the head. Then test run a tape. If cleaning fluid remains on the video head, the tape may be damaged when in comes into contact with the head surface.

(2) Cleaning the tape transport system and drive system, ect.

Wipe with gauze moistened with alcohol.

Notes:
1) The tape transport system is the system which comes into contact with the running tape. The drive system consists of those parts which run the tape.
2) Make sure that during cleaning you do not touch the tape transport system with the tip of a screwdriver and that no force is applied to the system that could deform it.

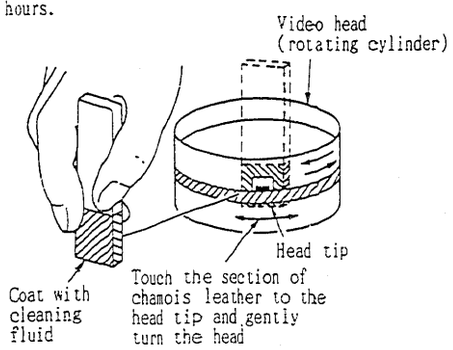
5-2 Lubrication

(1) Guidelines for lubricating with oil

Use the oiler to apply one or two drop of Sonic Slidas oil. Make sure not to use too much oil because it may spill over or leak out coming into contact with rotating parts and causing slippage or other problems. If too much oil is applied, wipe clean with alcohol.

(2) Periodic oil lubrication

Oil specified locations every 1,000 hours.


Video head
(rotating cylinder)
Head tip
Coat with cleaning fluid
Touch the section of chamois leather to the head tip and gently turn the head

5-3 Greasing

(1) Greasing guidelines

Apply grease Froil, with a stick or brush. Do not use excess grease. It may come into contact with the tape transport or drive system. Wipe any excess and clean with gauze moistened with alcohol.

(2) Periodic greasing

Grease specified locations every 5,000 hours.

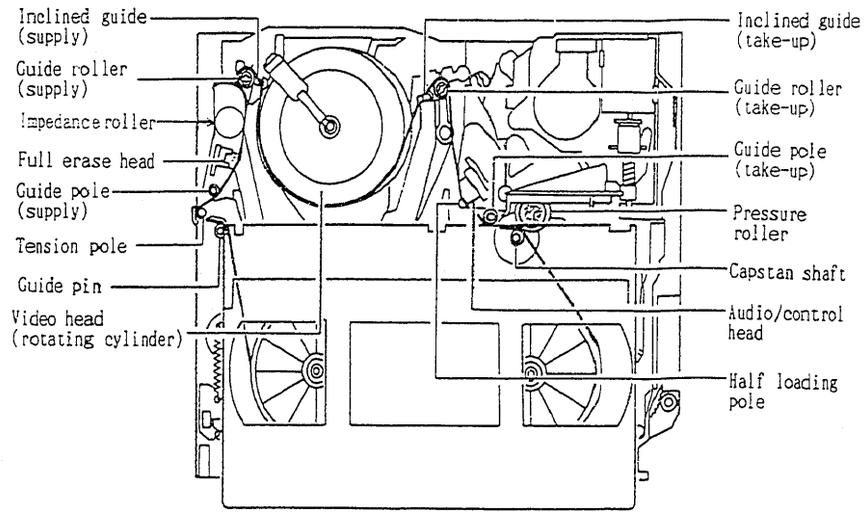


Fig. 1 Tape Transport System

6. Inspection Locations

Phenomenon	Inspection Location	Replacement	
Color beats	Dirt on full erase head		①
Poor S/N, no color	Dirt on video heads	○	②
Vertical jitter	Dirt on video heads		③
	Dirt in tape transport system		
Low volume, sound disordered	Dirt on audio/ control head	○	④
Tape does not run. Tape is slack.	Dirt on pressure roller	○	⑤

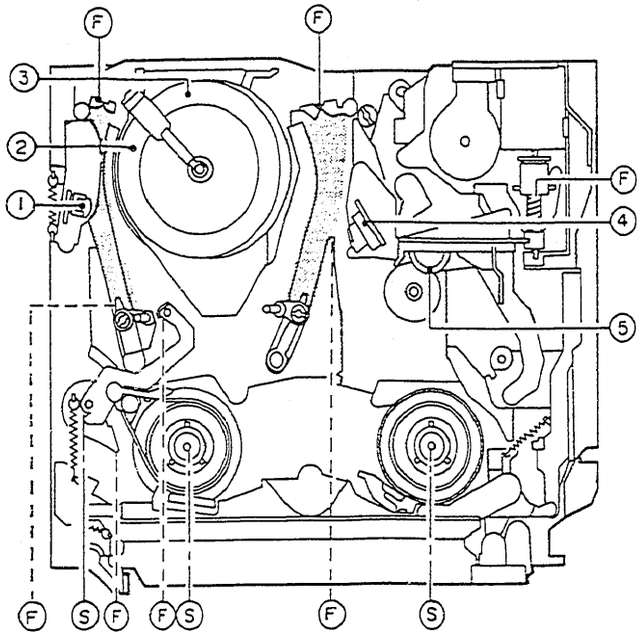


Fig. 2 Top View of Mechanism

Phenomenon	Inspection Location	Replacement
Does not fast forward or rewind, or rotation is slow	Dirt on reel belt	○
Tape dose not run		
Slack tape		

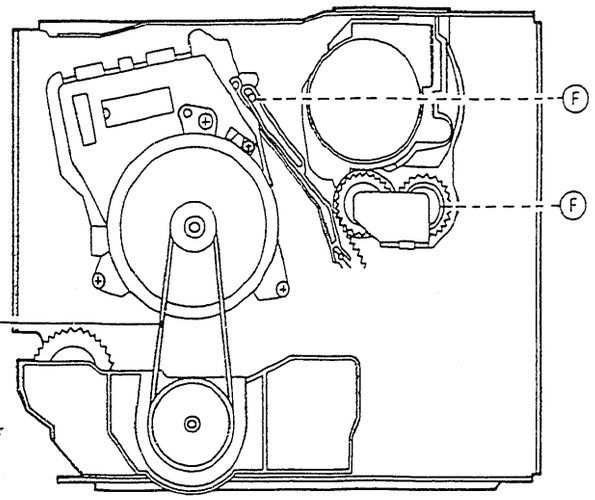


Fig. 3 Bottom View of Mechanism

Note:
If locations marked with "⊖" do not operate normally after cleaning, they are worn. Replace.
See the EXPLODED VIEWS at the end of this manual as well as the above illustrations for the sections to be lubricated and greased.

Ⓢ : Sonic Slidas oil (oil locations)

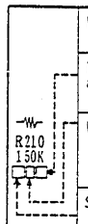
Ⓕ : Froil (grease locations)

SCHEMATIC/CIRCUIT BOARD DIAGRAMS

BEFORE USING THIS SERVICE REFERENCE MATERIAL

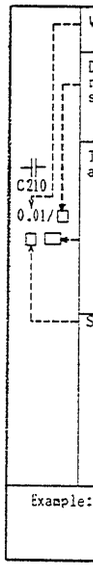
How to read abbreviations

(Resistors)



	Value	Not indicated ·· Ω (ohm) K ····· KΩ
	Tolerance	Not indicated ·· ±5% K ····· ±10% M ····· ±20%
	Wattage	Not indicated ·· 1/8W (All values other than 1/8W are indicated in the schematic diagrams with W omitted)
	Sort	Not indicated ·· Carbon film RC ····· Carbon solid RW ····· Wire wound RS ····· Metal oxide film RN ····· Metal film
Example: R210 ····· 150kohm, carbon solid RC1/2K 1/2W, ±10%		

(Capacitors)



	Value	Not indicated ·· μF P ····· PF
	Dielectric strength	Not indicated ·· 50WV (All values other than 50WV and electrolytic capacitors are indicated in the schematic diagrams with WV omitted)
	Tolerance	Not indicated ·· ±10% J ····· ±5% M ····· ±20% C ····· ±0.25PF Z ····· +80% -20% (No tolerance is indicated for electrolytic capacitors (excluding tantalum and high stability electrolytic capacitors))
	Sort	Not indicated ·· Ceramic General electrolytic (distinguished from ceramic with circuit symbol) MYL ····· Mylar (polyester film) STY ····· Styrol TA ····· Tantalum KU ····· High stability electrolytic MP ····· Metalized paper
Example: C210 0.01/25 ··· Mylar, 0.01μF, 25WV, ±5% MYL J		

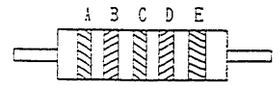
Notes:
1. Voltages are measured with the negative ⊖ terminal of the power supply as reference in the normal operating mode.
The voltages in different modes are indicated in the schematic diagrams ; those in parentheses ( ) are in the record mode and those without parentheses are in the play mode.
2. The value, dielectric strength (wattage), tolerance and sort of resistors (excluding variable resistors, etc.) and capacitors are indicated in the schematic diagrams by abbreviations. Replace them correctly, comparing the abbreviations in the schematic diagrams and the table 'how to read abbreviations'.

Cautions on use of MOS IC

1. The MOS IC is inserted in black foam for shipment. This foam is a conductor which short-circuits between the lends to prevent damage. Do not remove ICs from this foam during their storage. Avoid removing ICs from this foam, placing them on plastic which is likely to be charged with static electricity or inserting them into styrol foam.
2. High voltages may be applied during soldering caused by leakages from the soldering iron, so be sure to ground the tip of the soldering iron or use a low voltage soldering iron.
3. The human body, clothes made of synthetic fibers or nylon gloves may be charged with several thousands volts of static electricity because of friction, so a worker should be grounded.
4. Be sure to grounded measuring instruments such as oscilloscopes , VTVMs, etc. used for repairs.

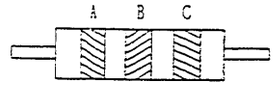
How to read capacity and inductance of resistor shape capacitors and coils

CAPACITOR



CAPACITY: (10A+B) × C (PF)
TOLERANCE : D
RATED VOLTAGE : BODY COLOR
PINK : 25V
GREEN : 50V
CHARACTERISTIC : E

COIL



INDUCTANCE: (10A+B) × C (μH)

COLOR	A,B	C	D	E
Black	0	10⁰	±20%	For temperature compensation
Brown	1	10¹		
Red	2	10²		
Orange	3	10³		
Yellow	4	10⁴		
Green	5	10⁵		
Blue	6			
Violet	7			
Gray	8		±30%	High dielectric constant type
White	9			For temperature compensation
Gold		10⁻¹	±5%	
Silver		10⁻²	±10%	High dielectric type

SERVICE MANUAL ABBREVIATION LIST

A	
A.DUB	Audio Dub
ACC	Automatic Color Control
ACK	Automatic Color Killer
ADD	Adder
AFC	Automatic Frequency Control
AGC	Automatic Gain Control
ALC	Automatic Level Control
ASBL	Assemble (Phase Matching)
APC	Automatic Phase Control
AUX	Auxiliary
B	
BATT.	Battery
BG	Burst Gate or Back Ground
BGP	Burst Gate Pulse
BH	Power Supply for Selecting VHF High Band
BL	Power Supply for Selecting VHF Low Band
BPF	Band-pass Filter
BS	Power Supply for Selecting VHF Super Band
BU	Power Supply for Selecting UHF Band
BUF.	Buffer Amplifier
C	
C	Chroma
C.FG/CFG	Capstan Frequency Generater
C.MEMORY	Counter Memory
C.PAUSE	Camera Pause
C.RESET	Counter Reset
C.REVERSE	Count Reverse
C.SYNC	Composite Synchronizing Signal
C/R	Capacitor/Resistor
CATV	Cable TV
CAPST.	Capstan
CCD	Charge Coupled Device
CH	Channel
CNR	Chroma Noise Reducer
CHAR.	Character
CON.	Common
COMP-EXP	Compressor-Expander
COMPA	Comparator
COMPE	Compensator
COM.	Composite
CONV.	Converter
CORR.	Correlation
COUNT.	Counter
CST	Cassette
CTL	Control Track Pulse
CYL.	Cylinder
D	
D/A	Digital to Analog
D/W	Dark/White
DA	Double Azimuth
DEEMPH.	Deemphasis
DEMOD.	Demodulator
DET	Detector
DISCRI.	Discriminator
DISP.	Display
DL	Delay line

DN	Down
DO	Dropout
DOC	Dropout Compensator
E	
E-E	Electronic-to-Electronic
EA-ROM	Electrically Alterable Read Only Memory
EMPH	Emphasis
EQ	Equalizer
EXT.	External
F	
FF	Flip Flop
F.FWD	Fast Forward
FG	Frequency Generator
FM	Frequency Modulation
FRAME ADV./F.ADV	Frame Advance
fsc	Color Sub Carrier Frequency
FWD	Forward
G	
GEN	Generator
GND	Ground
H	
HD	Horizontal Drive
Hi-Fi	High Fidelity
HPF	High-pass Filter
HPL	High-pass Limiter
HSS	Horizontal Sync. Separator
I	
I/O	In/Out (Input/Output)
IF	Intermediate Frequency
INDI.	Indicator
INT.	Internal
INV.	Inverter
IR	Infrared Rays
IRT	Instant Recording Timer
L	
LCD	Liquid Crystal Display
LIN.	Linear
LNC	Line Noise Canceller
LM	Loading Motor
LOG.	Logaritha
LPF	Low-pass Filter
L/R	Left/Right
LP	Long play
M	
M.CUT	Monitor Cut
M.STATE	Mechanism State
M.STOP	Memory Stop
MEM.	Memory
MIX	Mixer
MM	Monostable Multivibrator
MOD.	Modulator
MPX	Multiplex
MTS	Multi Channel Television Sound
N	
NF	Negative Feed Back
NORM.or NOR.	Normal
NR	Noise Reduction

O	
OSC	Oscillator
OSD	On-Screen Display
P	
PB/PLAY	Playback
PIF	Picture Intermediate Frequency
PLL	Phase Locked Loop
POS.	Positive
POWER CONT.	Power Control
PROG.	Program
PROTECT.	Protector
PWM	Pulse Width Modulation
R	
REC	Record
RECT.	Rectifier
REF	Reference
REG	Regulator
REV	Reverse
REW	Rewind
RF	Radio Frequency
RAM	Randum Access Memorey
ROM	Read Only Memory
S	
S/H	Sample and Hold
S.REEL	Supply Reel Sensor
S.TRACK.	Slow Tracking
S-VHS	Super VHS
SAW	Sawtooth
SAP	Second Audio Program
SEP.	Separator
SIF	Sound Intermediate Frequency
SP	Standard Play
SRCH	Search
SRV	Servo
SW 25Hz	Head Switching Pulse
SYNC	Synchronizing Signal
SYS.CON	System Control
T	
T/L	Tuner/Line
T.BRAKE	Take-up Brake
TμP	Timer Microprocessor
T.REEL	Take-up Reel Sensor
T.RESET	Timer Reset
TP	Test Point
TRS	Transfer
TU-μP	Tuning Microprocessor
U	
U/D	Up/Down
UNI.	Unified
V	
V-REF	Voltage Reference
V.DRV	Vertical Drive Pulse
V.DUB	Video Dub
VAR.	Variable
VCA	Voltage Controlled Amplitier
VCO	Voltage Controlled Oscillator
VHS	Video Home Systems

Vss	Voltage Super Source
VOL.	Volume
VSS	Vertical Sync. Separator
VT	Tuning Voltage
VT-U	Tuning Voltage-UHF
VT-V	Tuning Voltage-VHF
W	
WE	Weighting
Y	
Y/C	Luminance/Chrominance

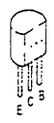
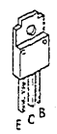
DIGITAL PROCESS CIRCUIT

A	
ADC B-Y	Analog to Digital Converted B-Y Signal
ADC R-Y	Analog to Digital Converted R-Y Signal
ADC Y	Analog to Digital Converted Luminance
ADRS	Address
C	
CAS	Column Address Strobe
C.BLANK	Chroma Blanking
D	
DRAM	Dynamic Random Access Memory
DEMPX	Demultiplexer
DWC	Delayed Write Clock
DT/OE	Data Transfer /Output Enable
D.REF 25	Delayed Reference 25Hz
D.SW 25	Delayed Switching 25Hz
I	
INC	Row Counter Increment
M	
MEM	Memory
MEM VIDEO	Memorized Video
MEM SW	Memory Switch
MEM ON	Memory ON
MPX	Multiplexer
MPX VIDEO	Multiplexed Video
O	
O/E	Odd/Even Field
P	
P IN P	Picture in Picture
PIX MOVE	Picture Move
R	
RC	Reading Clock
RCC	Reading Clock Clear
RCR	Row Counter Reset
RAS	Row Address Strobe
REF 25	Reference 25Hz from servo circuit
REL	Refresh Control
S	
SC	Serial Control
W	
WC	Write Clock
WCC	Write Clock Clear
WRITE ENBL (WE)	Write Enable

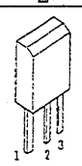
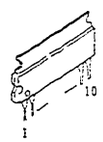
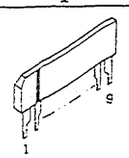
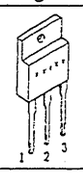
SEMICONDUCTOR CONFIGURATION

When replacing a semiconductor, take care of its pin numbers and makings (recess, paint) so as not to insert it in reverse.

TRANSISTOR

1	2	3
		
2SA673C 2SA844CD	KSC945 2SA933 2SC1740S 2SC3553(B/C) DTC144ES XDC144ES 2SA1390C 2SD1504E	2SD1765

IC (SINGLE INLINE PACKAGE)

1	2	3	4	5
				
S-8053ALB PST529I PST572H PST573H	DN6851HI	XRA6209U4 BA6209U4	NJM2248S	M5F7805L

IC (DUAL INLINE PACKAGE)

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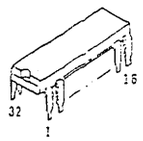
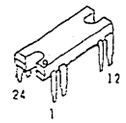
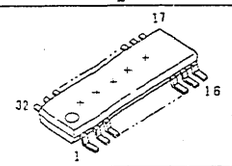
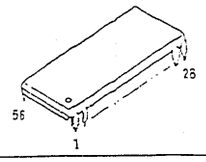
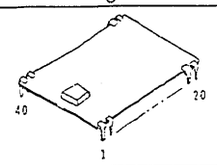
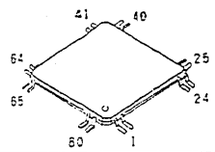
		
BA7046A CXL5507P	XRA7767AS	XRA6459P1

4	5	6
		
M50458-084FP	HD49741ANT	HT7273C HA118158NT HT7233A HT7225

7

M38174M8-107FP

INTERNAL WIRING DIAGRAM (For M251A, AW)

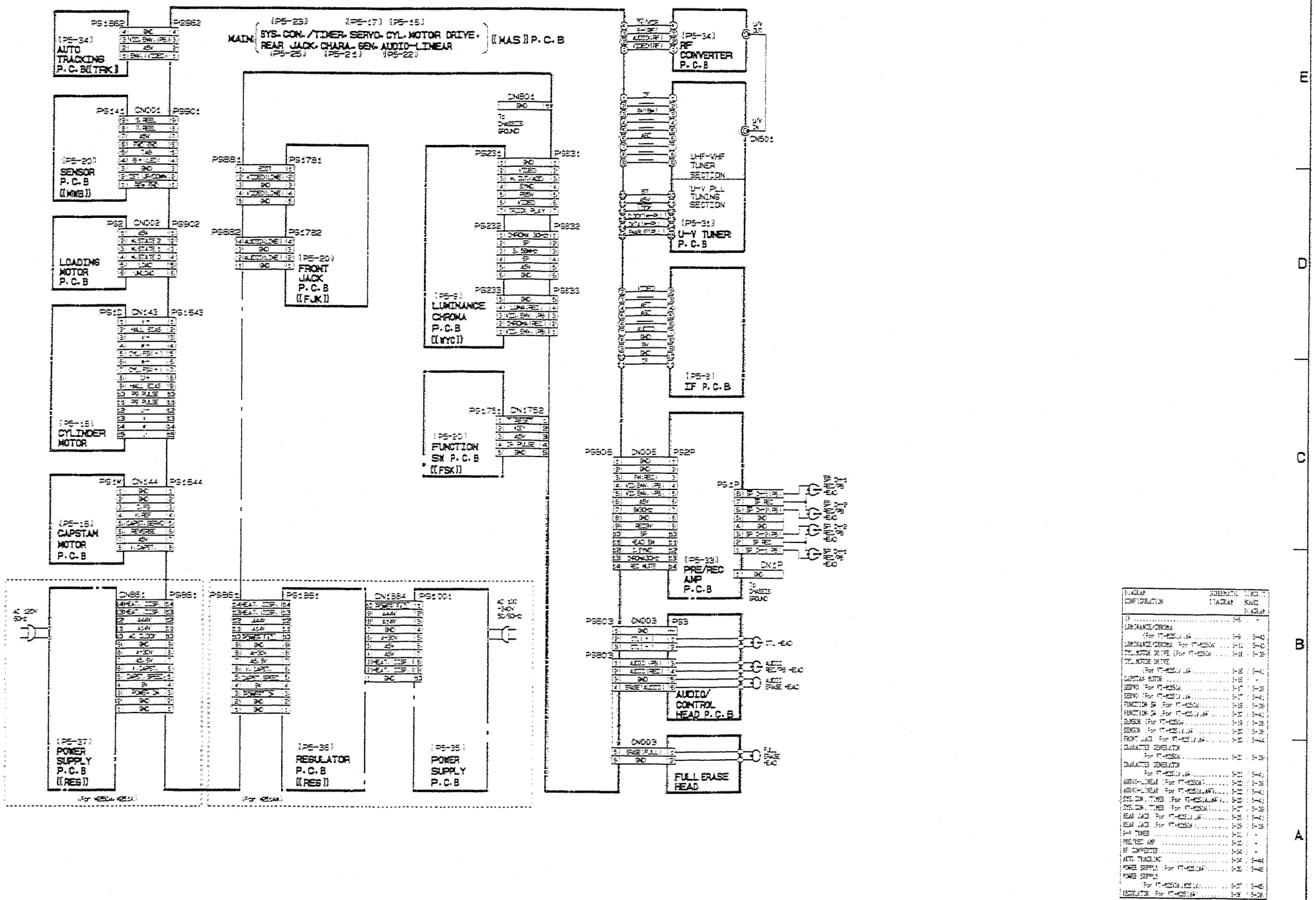
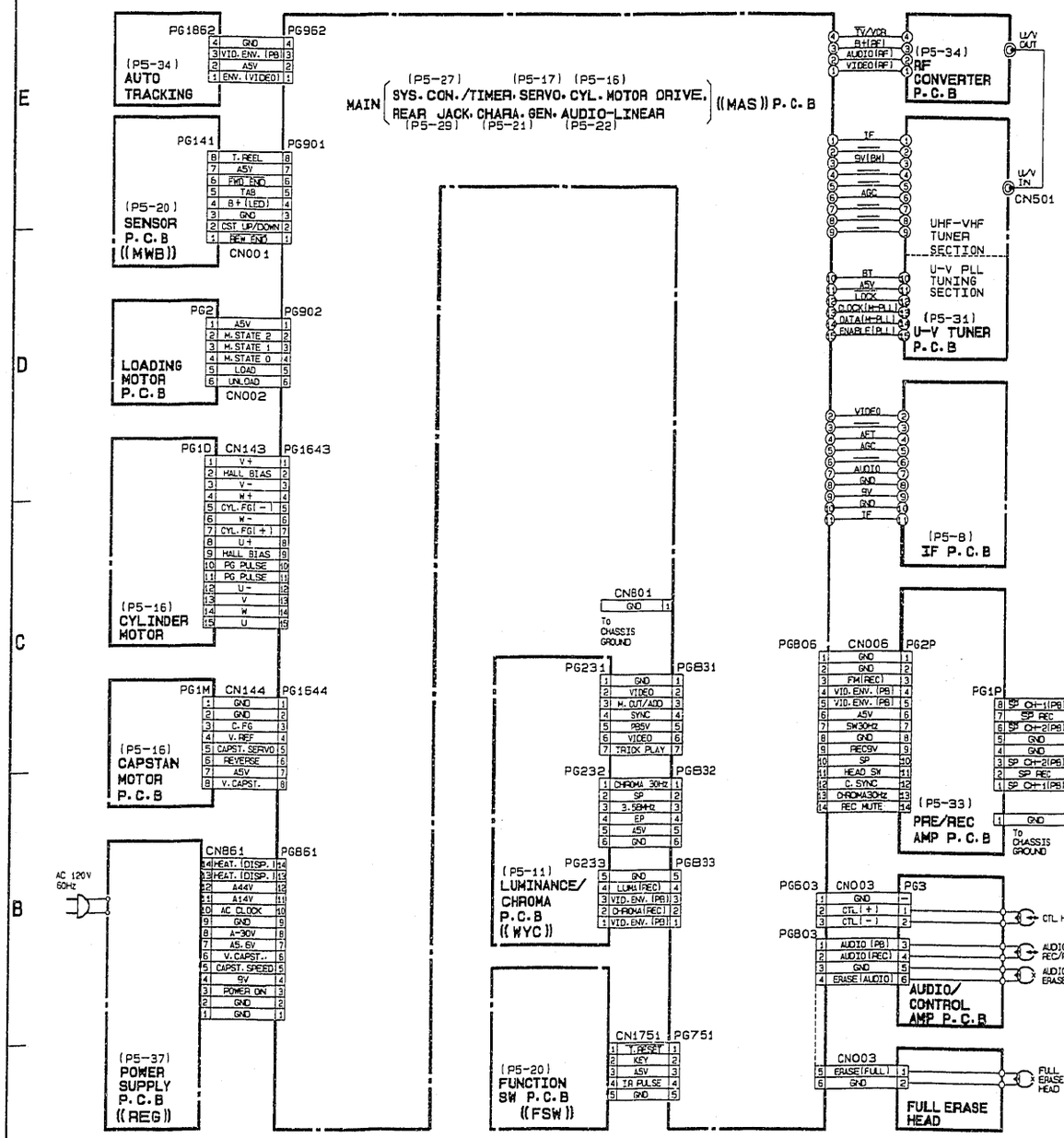


DIAGRAM CONSTRUCTION	SCHEMATIC DIAGRAM	BLOCK DIAGRAM
IF	5-5	-
LUMINANCE/CHROMA (For VT-M251A)	5-6	5-4A
LUMINANCE/CHROMA (For VT-M251AW)	5-11	5-4B
CYL. MOTOR DRIVE (For VT-M251A)	5-12	5-3A
CYL. MOTOR DRIVE (For VT-M251AW)	5-13	5-3B
CAPSTAN MOTOR	5-15	-
SERVO (For VT-M251A)	5-17	5-2A
SERVO (For VT-M251AW)	5-17	5-2B
FUNCTION SW (For VT-M251A)	5-18	5-3A
FUNCTION SW (For VT-M251AW)	5-19	5-3B
SENSOR (For VT-M251A)	5-19	5-3A
SENSOR (For VT-M251AW)	5-20	5-3B
FRONT JACK (For VT-M251AW)	5-20	5-4B
CHARACTER GENERATOR (For VT-M251A)	5-21	5-2A
CHARACTER GENERATOR (For VT-M251AW)	5-21	5-2B
AUDIO-LINEAR (For VT-M251A)	5-22	5-4A
AUDIO-LINEAR (For VT-M251AW)	5-23	5-4B
SYS. CON., TIMER (For VT-M251AW)	5-24	5-2B
SYS. CON., TIMER (For VT-M251A)	5-25	5-2A
REAR JACK (For VT-M251AW)	5-25	5-4B
REAR JACK (For VT-M251A)	5-26	5-4A
I-V TUNER	5-27	-
PRE/REC AMP	5-28	-
RF CONVERTER	5-29	-
AUTO TRACKING	5-30	5-4A
POWER SUPPLY (For VT-M251AW)	5-31	5-4B
POWER SUPPLY (For VT-M251A, M251)	5-32	5-4A
REGULATOR (For VT-M251AW)	5-33	5-4B

INTERNAL WIRING DIAGRAM (For M250A)



IF SCHEMATIC DIAGRAM

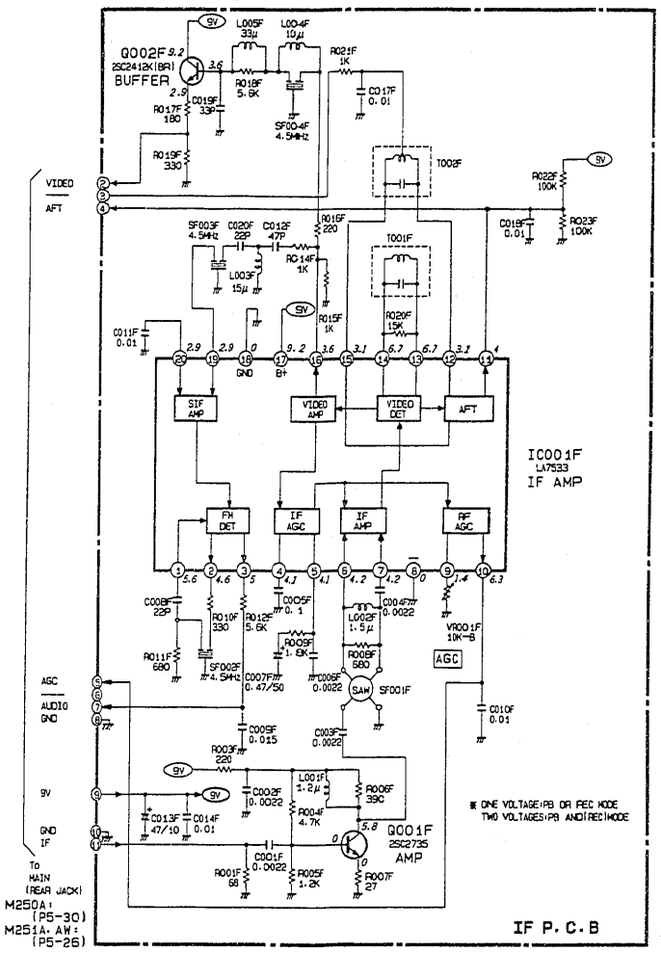
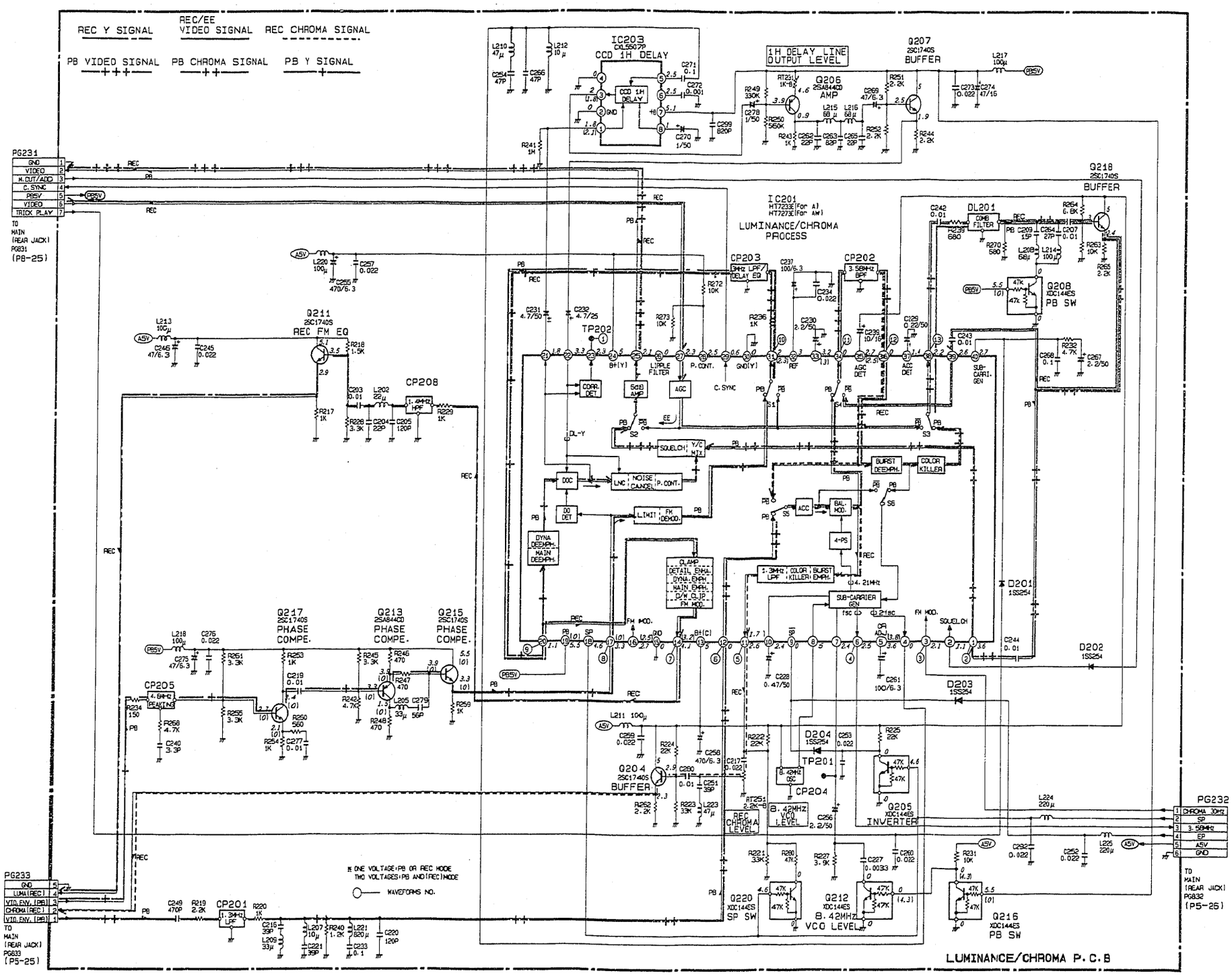


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
IF	5-8	/ -
LUMINANCE/CHROMA (For VT-M251A,AW)	5-9	/ 5-43
LUMINANCE/CHROMA (For VT-M250A)	5-11	/ 5-43
CYL.MOTOR DRIVE (For VT-M250A)	5-16	/ 5-39
CYL.MOTOR DRIVE (For VT-M251A,AW)	5-16	/ 5-41
CAPSTAN MOTOR	5-16	/ -
SERVO (For VT-M250A)	5-17	/ 5-39
SERVO (For VT-M251A,AW)	5-17	/ 5-41
FUNCTION SW (For VT-M250A)	5-19	/ 5-39
FUNCTION SW (For VT-M251A,AW)	5-20	/ 5-41
SENSOR (For VT-M250A)	5-19	/ 5-38
SENSOR (For VT-M251A,AW)	5-20	/ 5-38
FRONT JACK (For VT-M251A,AW)	5-20	/ 5-44
CHARACTER GENERATOR (For VT-M250A)	5-21	/ 5-39
CHARACTER GENERATOR (For VT-M251A,AW)	5-21	/ 5-41
AUDIO-LINEAR (For VT-M250A)	5-22	/ 5-39
AUDIO-LINEAR (For VT-M251A,AW)	5-22	/ 5-41
SYS.CON./TIMER (For VT-M251A,AW)	5-23	/ 5-41
SYS.CON./TIMER (For VT-M250A)	5-27	/ 5-39
REAR JACK (For VT-M251A,AW)	5-25	/ 5-41
REAR JACK (For VT-M250A)	5-25	/ 5-39
U-V TUNER	5-31	/ -
PRE/REC AMP	5-33	/ -
RF CONVERTER	5-34	/ -
AUTO TRACKING	5-34	/ 5-44
POWER SUPPLY (For VT-M251AW)	5-35	/ 5-46
POWER SUPPLY (For VT-M250A,M251A)	5-37	/ 5-45
REGULATOR (For VT-M251AW)	5-36	/ 5-38

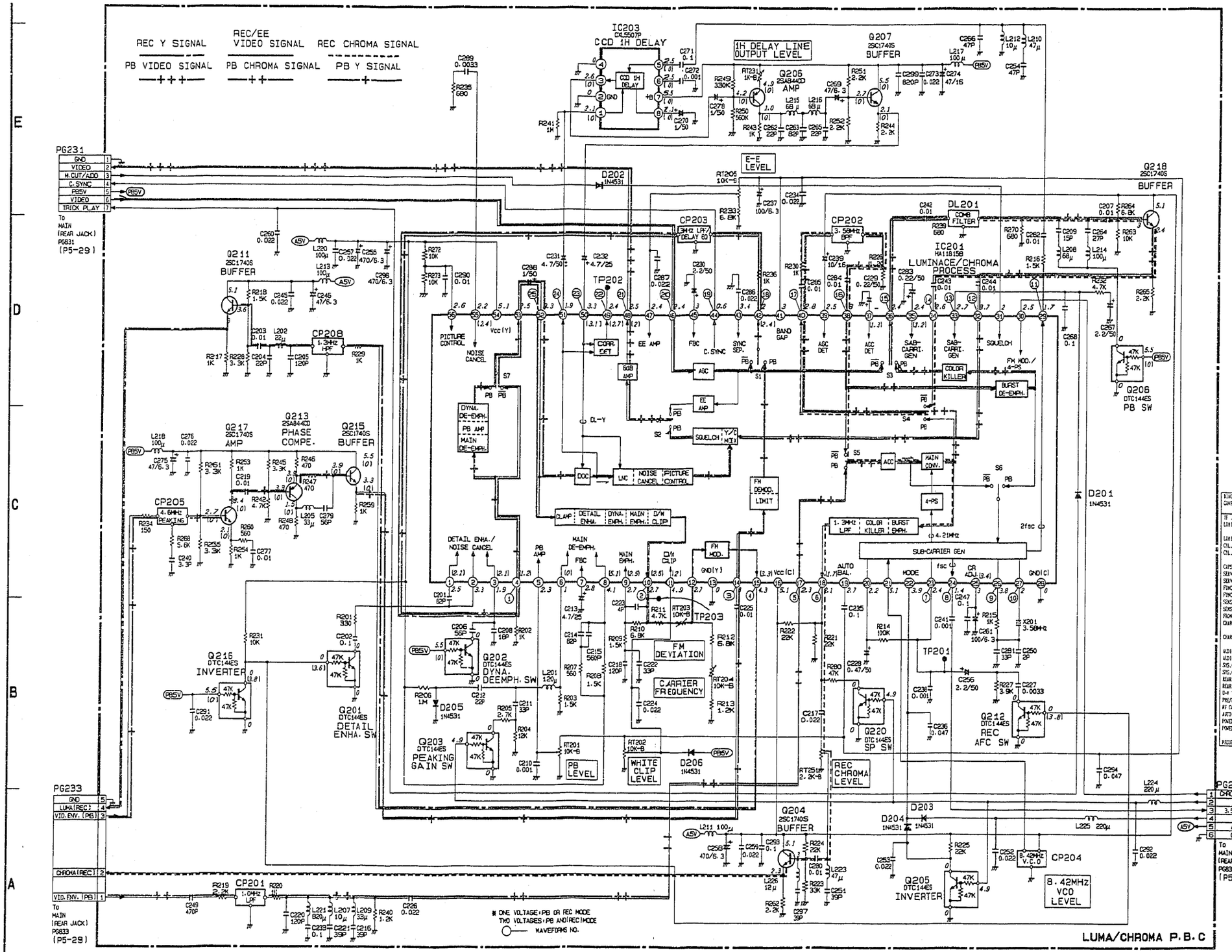
LUMINANCE/CHROMA SCHEMATIC DIAGRAM(For M251A, AW)



1 2 3 4 5 6 7 8

A B C D E

LUMINANCE/CHROMA SCHEMATIC DIAGRAM(For M250A)



BLOCK/IN CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
IC	5-8	/ -
LUMINANCE/CHROMA (For VT-M251A,AW)	5-9	/ 5-43
LUMINANCE/CHROMA (For VT-M250A)	5-11	/ 5-43
CYL.MOTOR DRIVE (For VT-M250A)	5-16	/ 5-39
CYL.MOTOR DRIVE (For VT-M251A,AW)	5-16	/ 5-41
CAPSTAN MOTOR	5-16	/ -
SERVO (For VT-M250A)	5-17	/ 5-39
SERVO (For VT-M251A,AW)	5-17	/ 5-41
FUNCTION SW (For VT-M250A)	5-19	/ 5-39
FUNCTION SW (For VT-M251A,AW)	5-20	/ 5-41
SENSOR (For VT-M250A)	5-19	/ 5-38
SENSOR (For VT-M251A,AW)	5-20	/ 5-38
FRONT JACK (For VT-M251A,AW)	5-20	/ 5-44
CHARACTER GENERATOR (For VT-M250A)	5-21	/ 5-39
CHARACTER GENERATOR (For VT-M251A,AW)	5-21	/ 5-41
AUDIO-LINEAR (For VT-M250A)	5-22	/ 5-39
AUDIO-LINEAR (For VT-M251A,AW)	5-22	/ 5-41
SYS.CON./TIMER (For VT-M251A,AW)	5-23	/ 5-41
SYS.CON./TIMER (For VT-M250A)	5-27	/ 5-39
REAR JACK (For VT-M251A,AW)	5-25	/ 5-41
REAR JACK (For VT-M250A)	5-29	/ 5-39
D-4 TUNER	5-31	/ -
PREFREC AMP	5-33	/ -
AF CONTENTED	5-34	/ -
AUTO TRACKING	5-34	/ 5-44
POWER SUPPLY (For VT-M251AW)	5-35	/ 5-45
POWER SUPPLY (For VT-M250A,M251A)	5-37	/ 5-45
REGULATOR (For VT-M251AW)	5-36	/ 5-36

LUMINANCE/CHROMA WAVEFORMS (For M250A)

1-A IC201-4 500mVp-p 0.2V/20.0μ sec.cm REC	7-A IC201-23 60mVp-p 20mV/5.0μ sec.cm REC/PLAY	13-A IC201-33 72mVp-p 20mV/10.0μ sec.cm REC/PLAY	17-B IC201-40 200mVp-p 50mV/20.0μ sec.cm PLAY	23-A IC201-50 90mVp-p 50mV/20.0μ sec.cm REC
1-B IC201-4 200mVp-p 0.1V/20.0μ sec.cm PLAY	8-A IC201-24 550mVp-p 0.2V/200nsec.cm REC/PLAY	14-A IC201-34 70mVp-p 20mV/20.0μ sec.cm REC	18-A IC201-42 970mVp-p 0.2V/20.0μ sec.cm REC	23-B IC201-50 600mVp-p 0.2V/20.0μ sec.cm PLAY
2-A IC201-10 1.2Vp-p 0.5V/20.0μ sec.cm REC	9-A IC201-26 1.4Vp-p 0.5V/200nsec.cm REC	14-B IC201-34 95mVp-p 20mV/20.0μ sec.cm PLAY	18-B IC201-42 590mVp-p 0.2V/20.0μ sec.cm PLAY	24-A IC201-51 480mVp-p 0.1V/20.0μ sec.cm REC
3-B IC201-14 350mVp-p 0.1V/5.0msec.cm PLAY	9-B IC201-26 1.4Vp-p 0.5V/200nsec.cm PLAY	15-A IC201-36 1.0Vp-p 0.2V/20.0μ sec.cm REC	19-A IC201-44 5.2Vp-p 2V/20.0μ sec.cm REC/PLAY	24-B IC201-51 600mVp-p 0.1V/20.0μ sec.cm PLAY
4-A IC201-15 900mVp-p 0.2V/20.0μ sec.cm REC	10-A IC201-27 600mVp-p 0.2V/200nsec.cm REC/PLAY	15-B IC201-36 500mVp-p 0.2V/20.0μ sec.cm PLAY	20-A IC201-46 2.0Vp-p 0.5V/20.0μ sec.cm REC	25-A IC201-52 490mVp-p 0.1V/20.0μ sec.cm REC
5-B IC201-17 50mVp-p 20mV/5.0msec.cm PLAY	11-A IC201-29 620mVp-p 0.2V/100nsec.cm REC/PLAY	16-A IC201-38 150mVp-p 50mV/20.0μ sec.cm REC	21-A IC201-48 2.0Vp-p 0.5V/20.0μ sec.cm REC	25-B IC201-52 600mVp-p 0.1V/20.0μ sec.cm PLAY
6-A IC201-18 190mVp-p 50mV/20.0μ sec.cm REC	12-A IC201-32 70mVp-p 20mV/20.0μ sec.cm REC	16-B IC201-38 60mVp-p 20mV/20.0μ sec.cm PLAY	21-B IC201-48 2.3Vp-p 0.5V/20.0μ sec.cm PLAY	
6-B IC201-18 68.0mVp-p 20mV/5.0μ sec.cm PLAY	12-B IC201-32 98mVp-p 20mV/20.0μ sec.cm PLAY	17-A IC201-40 340mVp-p 0.1V/20.0μ sec.cm REC	22-A IC201-49 1Vp-p 0.2V/20.0μ sec.cm REC	

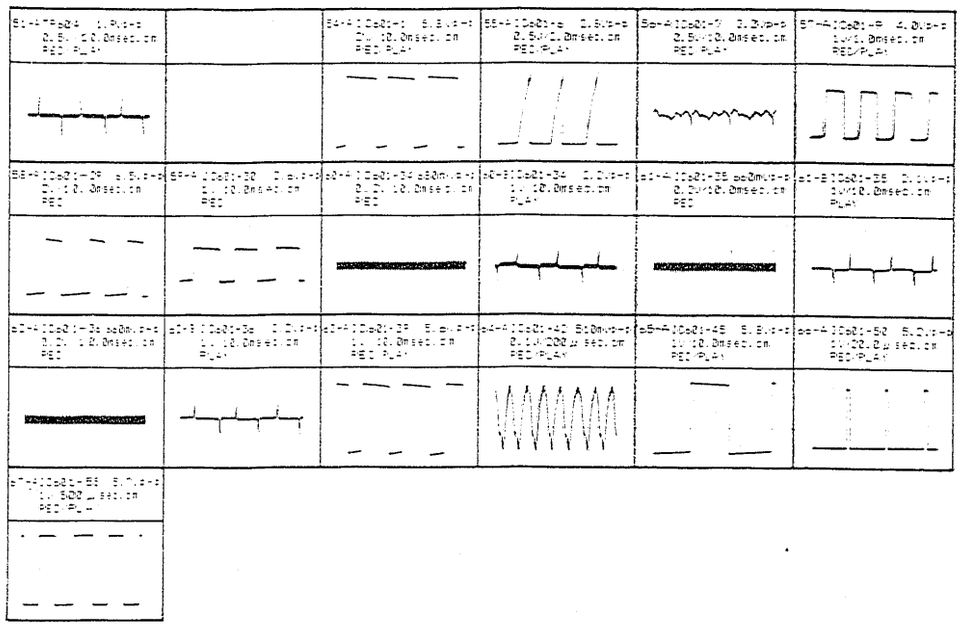
LUMINANCE/CHROMA WAVEFORMS (For M251A/AW)

LUMINANCE/CHROMA

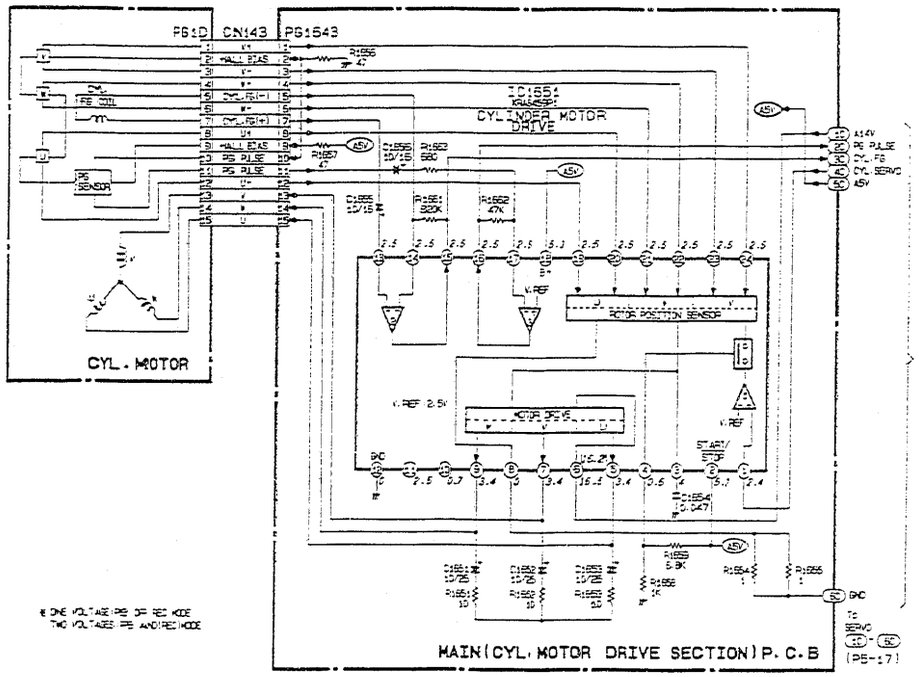
1-A IC201-1 190mVp-p 50mV/20.0μ sec.cm REC/PLAY	8-B IC201-20 210mVp-p 0.1V/20.0μ sec.cm PLAY
2-A IC201-3 4.4Vp-p 1V/5.0msec.cm REC/PLAY	9-A IC201-31 800mVp-p 0.2V/20.0μ sec.cm REC
3-A IC201-6 490mVp-p 0.1V/200nsec.cm REC/PLAY	9-B IC201-31 510mVp-p 0.2V/20.0μ sec.cm PLAY
4-A IC201-11 190mVp-p 50mV/20.0μ sec.cm REC	10-A IC201-34 310mVp-p 0.1V/20.0μ sec.cm REC/PLAY
5-B IC201-12 32mVp-p 20mV/20.0μ sec.cm PLAY	11-A IC201-36 200mVp-p 50mV/20.0μ sec.cm REC
6-A IC201-14 850mVp-p 0.2V/20.0μ sec.cm REC	11-B IC201-36 110mVp-p 50mV/20.0μ sec.cm PLAY
7-B IC201-17 350mVp-p 0.1V/5.0msec.cm PLAY	12-A IC201-38 810mVp-p 0.2V/20.0μ sec.cm REC
8-A IC201-20 400mVp-p 0.1V/20.0μ sec.cm REC	12-B IC201-38 820mVp-p 0.2V/20.0μ sec.cm PLAY

DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
TP	5-8	-
LUMINANCE/CHROMA (For VT-M251A,AW)	5-9	5-43
LUMINANCE/CHROMA (For VT-M250A)	5-11	5-43
CYL.MOTOR DRIVE (For VT-M250A)	5-16	5-39
CYL.MOTOR DRIVE (For VT-M251A,AW)	5-16	5-41
CAPSTAN MOTOR	5-16	-
SERVO (For VT-M250A)	5-17	5-39
SERVO (For VT-M251A,AW)	5-17	5-41
FUNCTION SW (For VT-M250A)	5-19	5-39
FUNCTION SW (For VT-M251A,AW)	5-20	5-41
SENSOR (For VT-M250A)	5-19	5-38
SENSOR (For VT-M251A,AW)	5-20	5-38
FRONT JACK (For VT-M251A,AW)	5-20	5-42
CHARACTER GENERATOR (For VT-M250A)	5-21	5-39
CHARACTER GENERATOR (For VT-M251A,AW)	5-21	5-41
AUDIO-LINEAR (For VT-M250A)	5-22	5-39
AUDIO-LINEAR (For VT-M251A,AW)	5-22	5-41
SYS.CON./TIMER (For VT-M251A,AW)	5-23	5-41
SYS.CON./TIMER (For VT-M250A)	5-27	5-39
REAR JACK (For VT-M251A,AW)	5-25	5-41
REAR JACK (For VT-M250A)	5-29	5-39
U-V TUNER	5-31	-
PRE/REC AMP	5-33	-
RF CONVERTER	5-34	-
AUTO TRACING	5-34	5-44
POWER SUPPLY (For VT-M251AW)	5-35	5-46
POWER SUPPLY (For VT-M250A,M251A)	5-37	5-45
REGULATOR (For VT-M251AW)	5-36	5-38

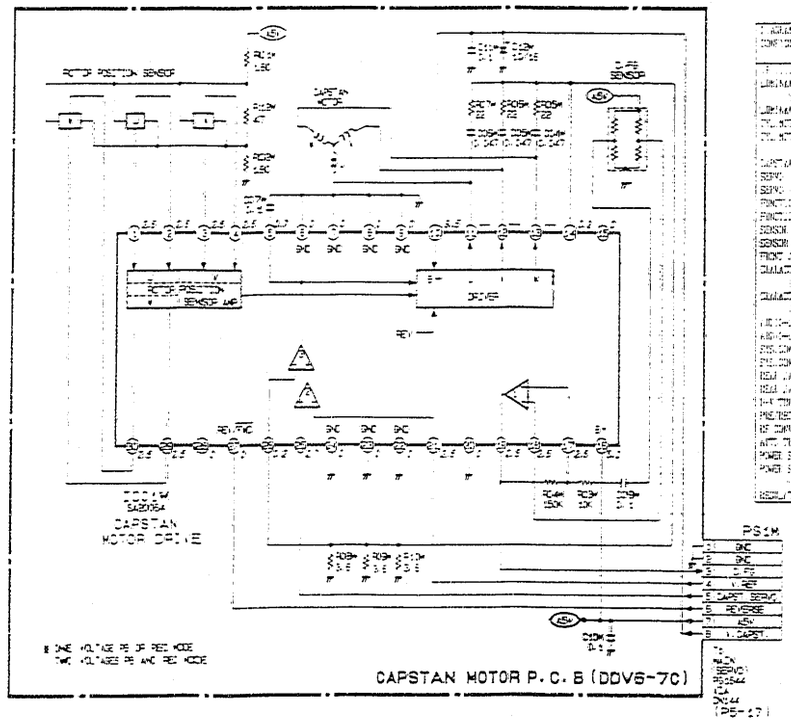
SERVO WAVEFORMS



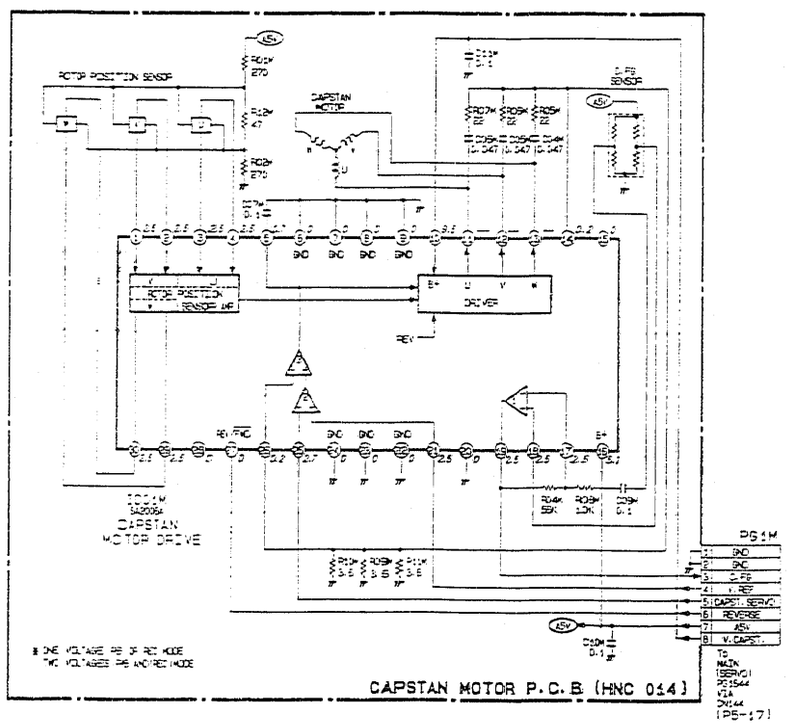
CYL. MOTOR DRIVE SCHEMATIC DIAGRAM



CAPSTAN MOTOR SCHEMATIC DIAGRAM (DDV6-7C)



CAPSTAN MOTOR SCHEMATIC DIAGRAM (HNC 014)



SERVO SCHEMATIC DIAGRAM

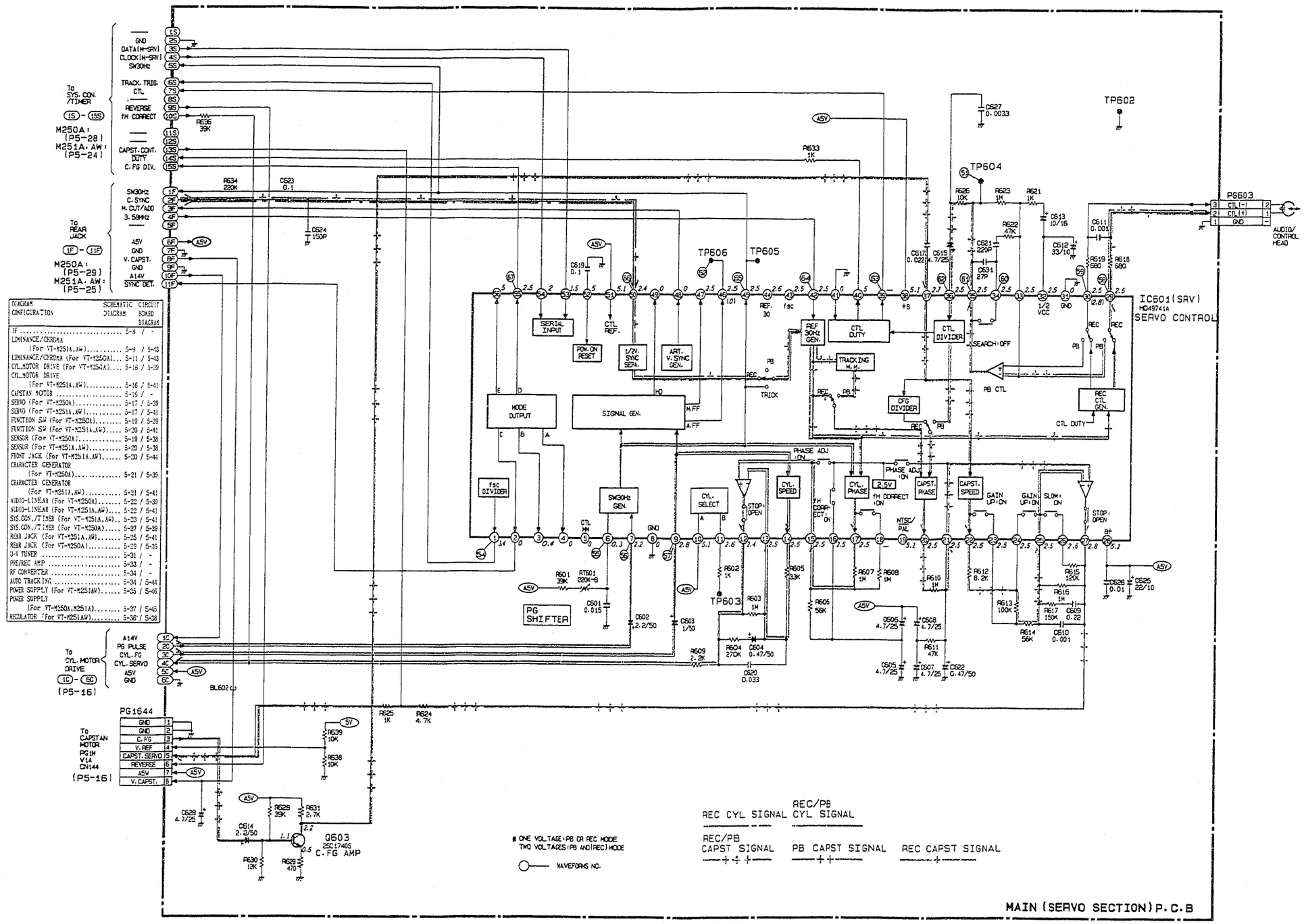
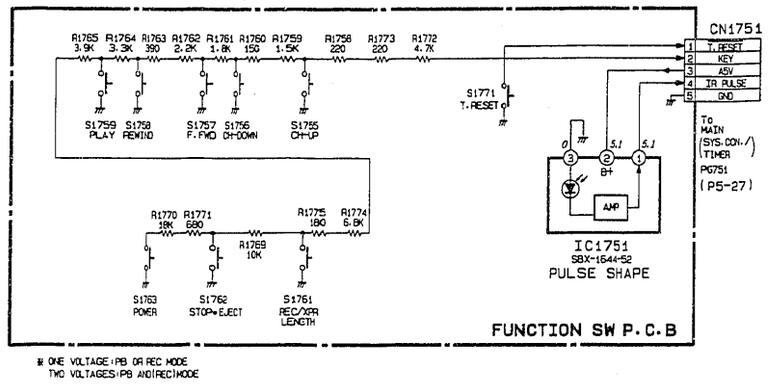
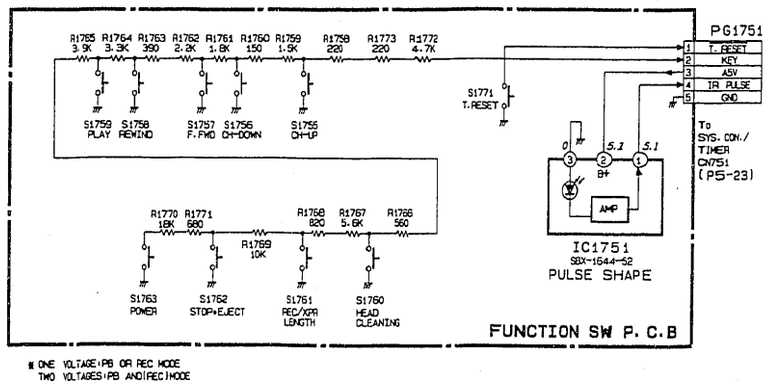


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
IF	5-8	-
LUMINANCE/CHROMA (For VT-M251A,AW)	5-9	5-43
LUMINANCE/CHROMA (For VT-M250A)	5-11	5-43
CYL.MOTOR DRIVE (For VT-M250A)	5-16	5-39
CYL.MOTOR DRIVE (For VT-M251A,AW)	5-16	5-41
CAPSTAN MOTOR	5-16	-
SERVO (For VT-M250A)	5-17	5-39
SERVO (For VT-M251A,AW)	5-17	5-41
FUNCTION SW (For VT-M250A)	5-19	5-39
FUNCTION SW (For VT-M251A,AW)	5-20	5-41
SENSOR (For VT-M250A)	5-19	5-38
SENSOR (For VT-M251A,AW)	5-20	5-38
FRONT JACK (For VT-M251A,AW)	5-20	5-44
CHARACTER GENERATOR (For VT-M250A)	5-21	5-39
CHARACTER GENERATOR (For VT-M251A,AW)	5-21	5-41
AUDIO-LINEAR (For VT-M250A)	5-22	5-39
AUDIO-LINEAR (For VT-M251A,AW)	5-22	5-41
SYS.CON./TIMER (For VT-M251A,AW)	5-23	5-41
SYS.CON./TIMER (For VT-M250A)	5-27	5-39
REAR JACK (For VT-M251A,AW)	5-25	5-41
REAR JACK (For VT-M250A)	5-29	5-35
U-V TUNER	5-31	-
PRE/REC AMP	5-33	-
RF CONVERTER	5-34	-
AUTO TRACKING	5-34	5-44
POWER SUPPLY (For VT-M251AW)	5-35	5-46
POWER SUPPLY (For VT-M250A,M251A)	5-37	5-45
REGULATOR (For VT-M251AW)	5-36	5-38

FUNCTION SW SCHEMTIC DIAGRAM (For M250A)



FUNCTION SW SCHEMTIC DIAGRAM (For M251A, AW)



SENSOR SCHEMTIC DIAGRAM (For M250A)

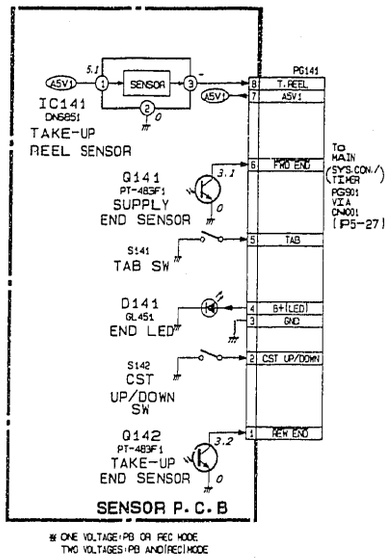
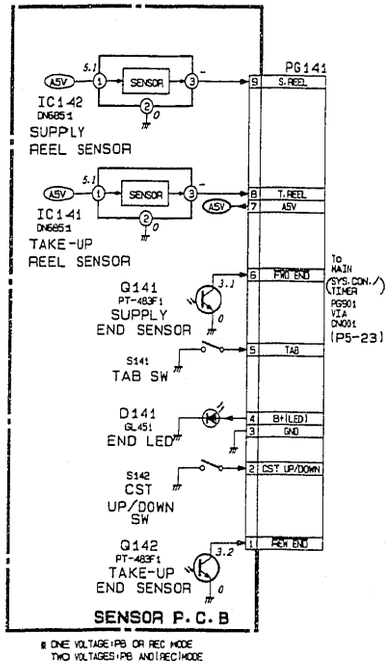
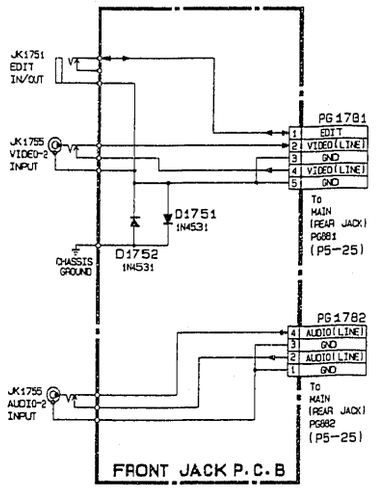


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
IF	5-9	/ -
LUMINANCE/CHROMA (For VT-M251A,AW)	5-9	/ 5-43
LUMINANCE/CHROMA (For VT-M250A)	5-11	/ 5-43
CYL.MOTOR DRIVE (For VT-M250A)	5-16	/ 5-39
CYL.MOTOR DRIVE (For VT-M251A,AW)	5-16	/ 5-41
CAPSTAN MOTOR	5-16	/ -
SERVO (For VT-M250A)	5-17	/ 5-39
SERVO (For VT-M251A,AW)	5-17	/ 5-41
FUNCTION SW (For VT-M250A)	5-19	/ 5-39
FUNCTION SW (For VT-M251A,AW)	5-20	/ 5-41
SENSOR (For VT-M250A)	5-19	/ 5-38
SENSOR (For VT-M251A,AW)	5-20	/ 5-38
FRONT JACK (For VT-M251A,AW)	5-20	/ 5-44
CHARACTER GENERATOR (For VT-M250A)	5-21	/ 5-39
CHARACTER GENERATOR (For VT-M251A,AW)	5-21	/ 5-41
AUDIO-LINEAR (For VT-M250A)	5-22	/ 5-39
AUDIO-LINEAR (For VT-M251A,AW)	5-22	/ 5-41
SYS.CON./TIMER (For VT-M251A,AW)	5-23	/ 5-41
SYS.CON./TIMER (For VT-M250A)	5-27	/ 5-39
REAR JACK (For VT-M251A,AW)	5-25	/ 5-41
REAR JACK (For VT-M250A)	5-25	/ 5-39
U-V TUNER	5-31	/ -
PRE/REC AMP	5-33	/ -
RF CONVERTER	5-34	/ -
AUTO TRACKING	5-34	/ 5-44
POWER SUPPLY (For VT-M251AW)	5-35	/ 5-46
POWER SUPPLY (For VT-M250A,M251A)	5-37	/ 5-45
REGULATOR (For VT-M251AW)	5-36	/ 5-38

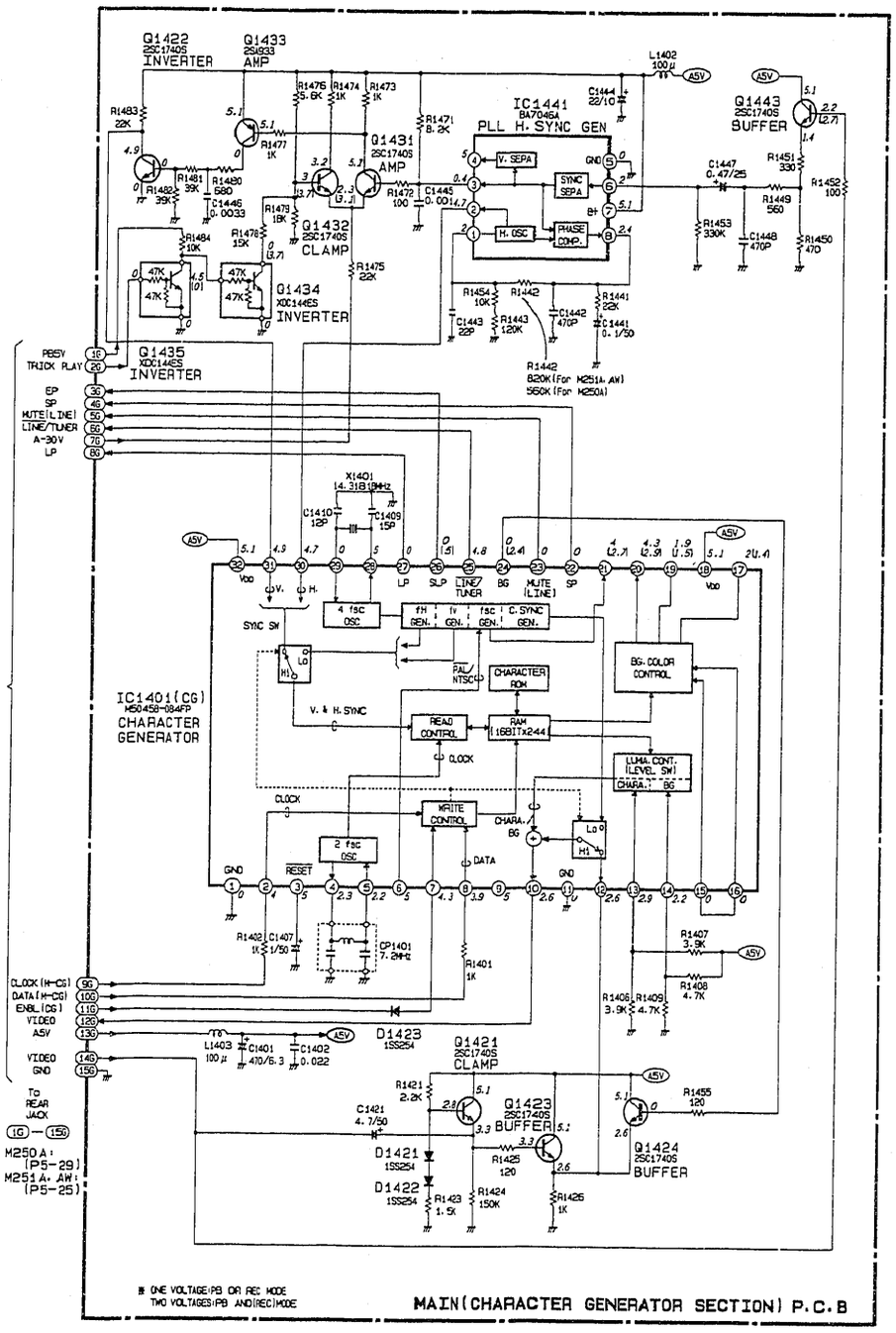
SENSOR SCHEMTIC DIAGRAM (For M251A, AW)



FRONT JACK SCHEMTIC DIAGRAM (For M251A, AW)



CHARACTER GENERATOR SCHEMATIC DIAGRAM



AUDIO-LINEAR SCHEMATIC DIAGRAM

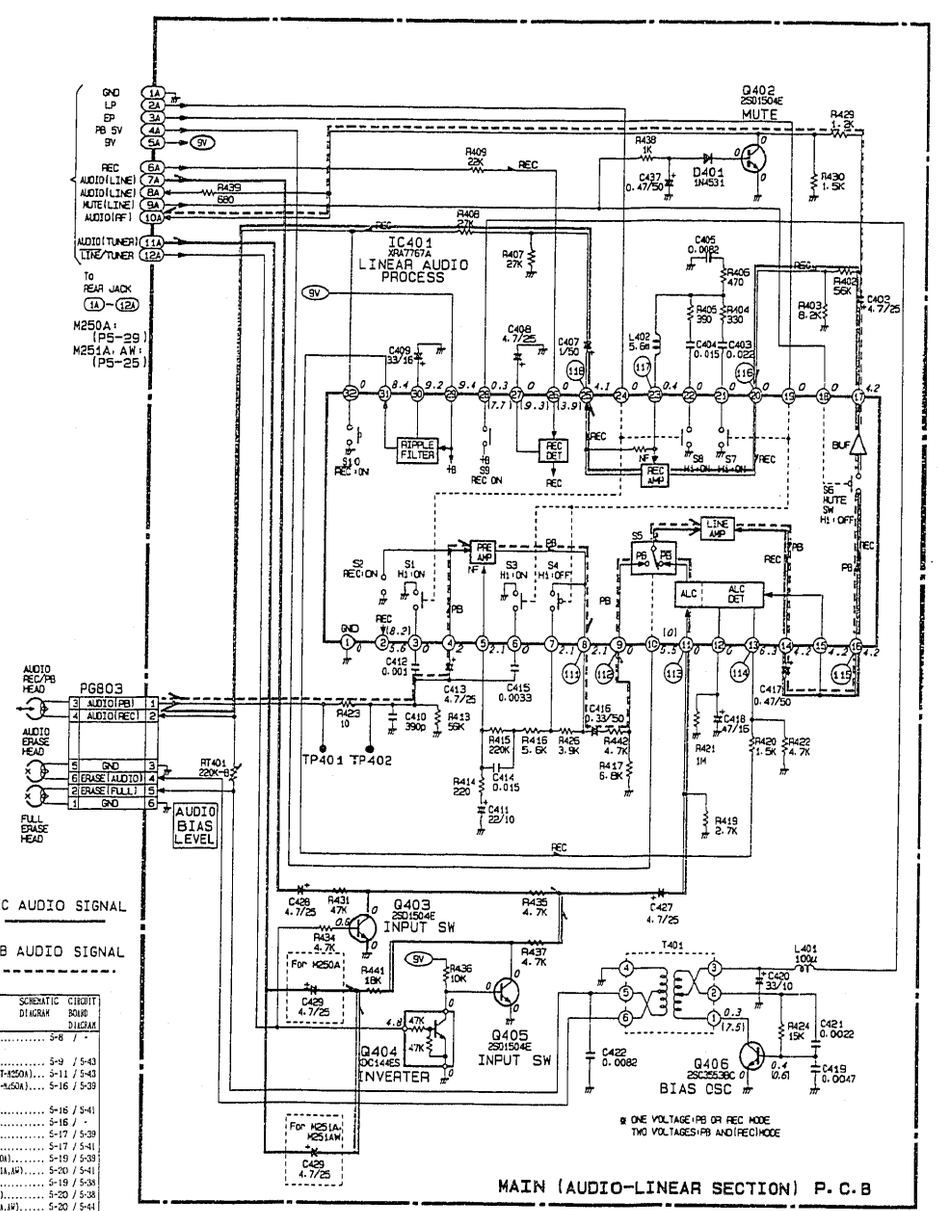
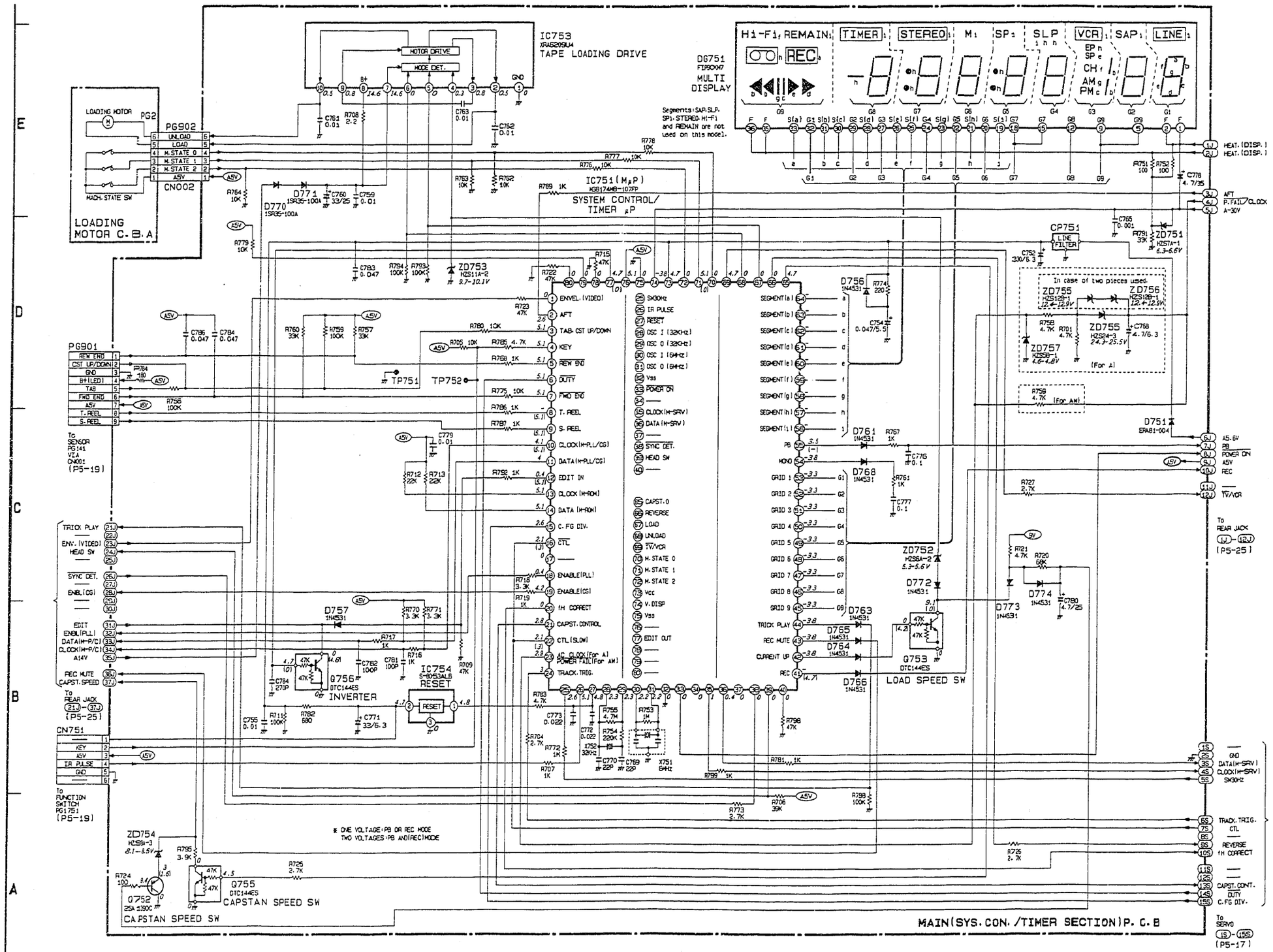
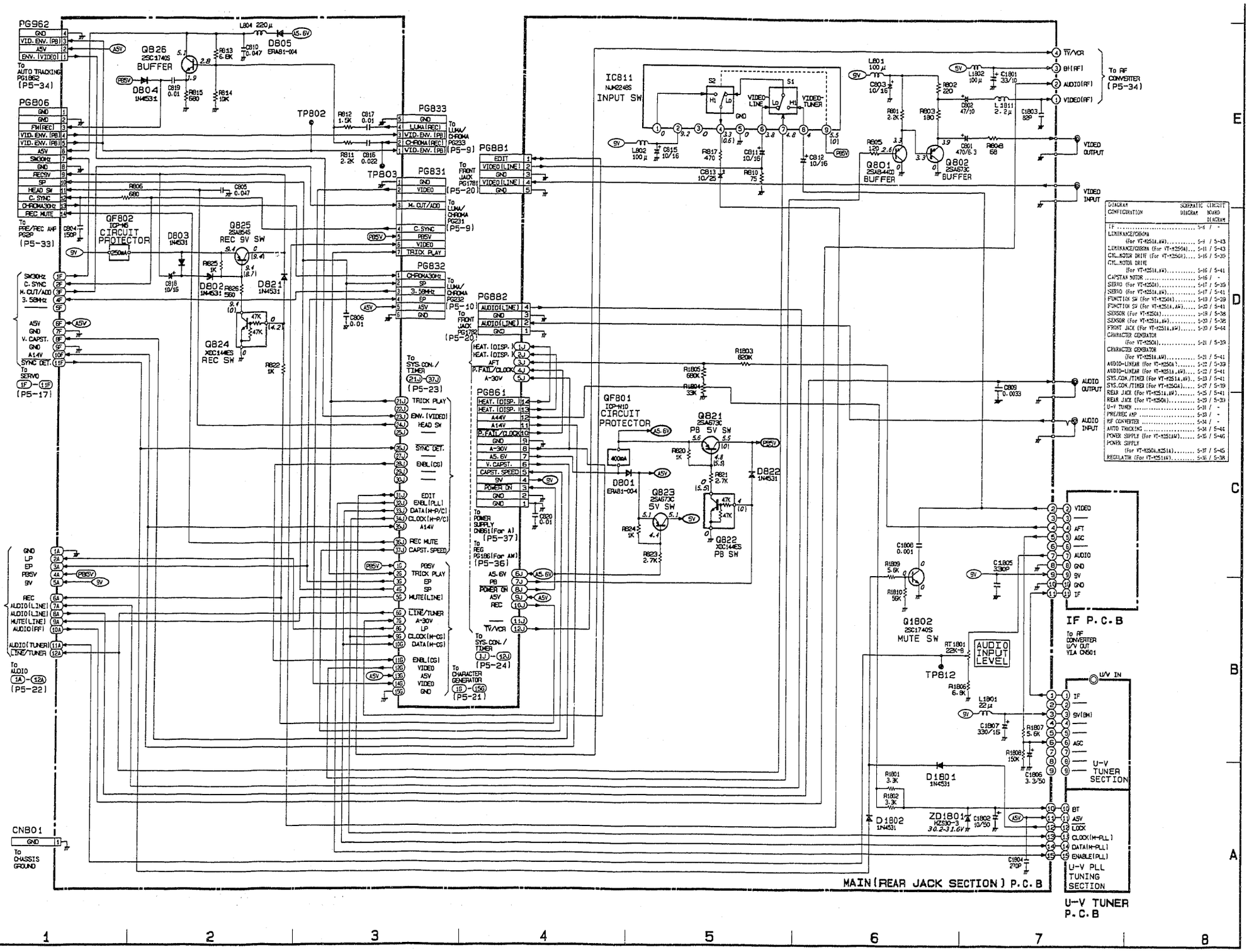


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
IF	5-8	/ -
LUMINANCE/CHROMA (For VT-M251A,AW)	5-9	/ 5-43
LUMINANCE/CHROMA (For VT-M250A)	5-11	/ 5-43
CYL.MOTOR DRIVE (For VT-M250A)	5-16	/ 5-39
CYL.MOTOR DRIVE (For VT-M251A,AW)	5-16	/ 5-41
CAPSTAN MOTOR	5-16	/ -
SERVO (For VT-M250A)	5-17	/ 5-39
SERVO (For VT-M251A,AW)	5-17	/ 5-41
FUNCTION SW (For VT-M250A)	5-19	/ 5-38
FUNCTION SW (For VT-M251A,AW)	5-20	/ 5-41
SENSOR (For VT-M250A)	5-19	/ 5-38
SENSOR (For VT-M251A,AW)	5-20	/ 5-38
FRONT JACK (For VT-M251A,AW)	5-20	/ 5-44
CHARACTER GENERATOR (For VT-M250A)	5-21	/ 5-39
CHARACTER GENERATOR (For VT-M251A,AW)	5-21	/ 5-41
AUDIO-LINEAR (For VT-M250A)	5-22	/ 5-39
AUDIO-LINEAR (For VT-M251A,AW)	5-22	/ 5-41
SYS.CON./TIMER (For VT-M251A,AW)	5-23	/ 5-41
SYS.CON./TIMER (For VT-M250A)	5-27	/ 5-39
REAR JACK (For VT-M251A,AW)	5-25	/ 5-41
REAR JACK (For VT-M250A)	5-29	/ 5-39
U-V TUNER	5-31	/ -
PRE/REC AMP	5-33	/ -
RF CONVERTER	5-34	/ -
AUTO TRACKING	5-34	/ 5-44
POWER SUPPLY (For VT-M251AW)	5-35	/ 5-46
POWER SUPPLY (For VT-M250A,M251A)	5-37	/ 5-15
REGULATOR (For VT-M251AW)	5-35	/ 5-36

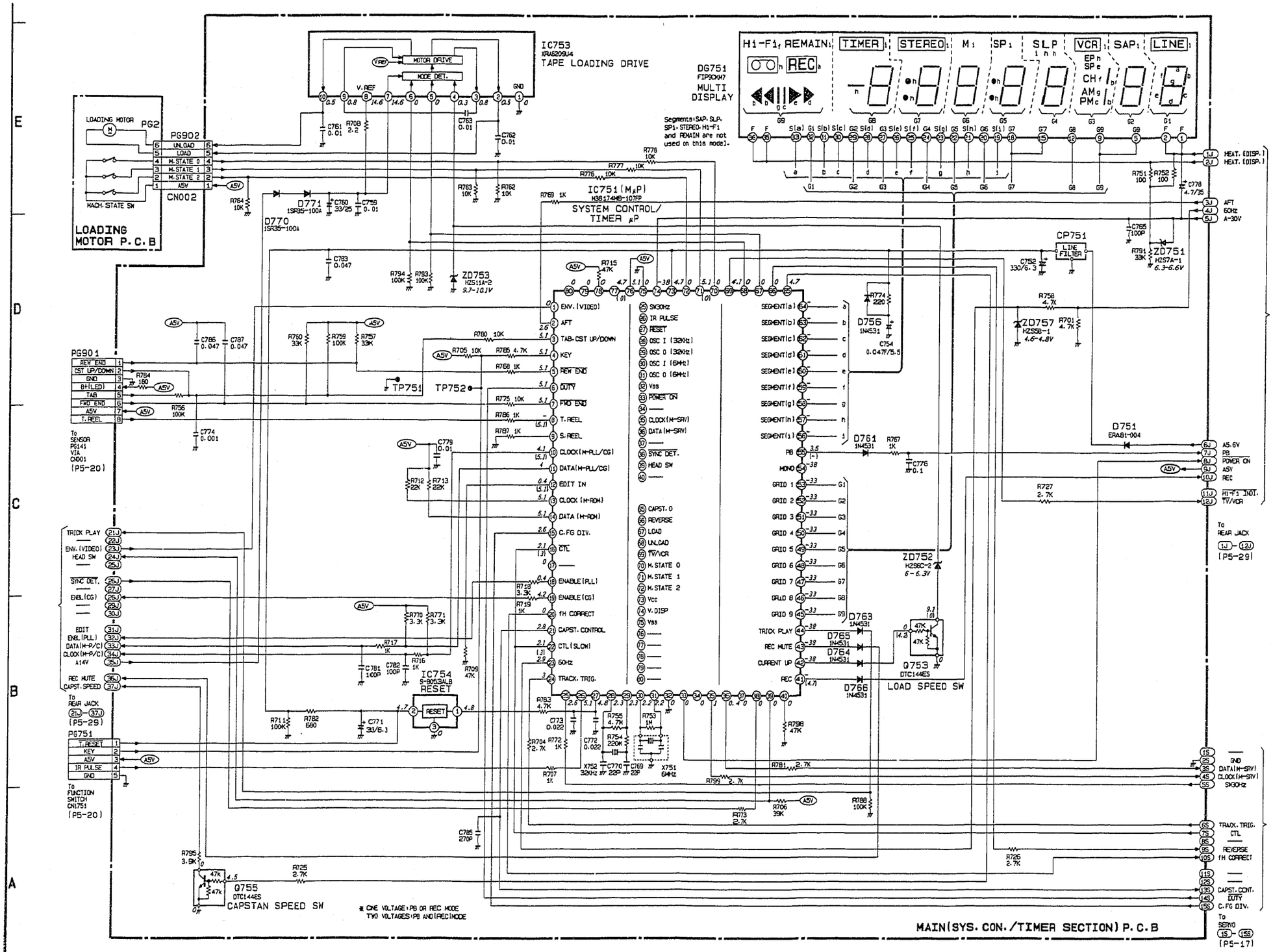
SYS. CON. /TIMER SCHEMATIC DIAGRAM (For M251A, AW)



REAR JACK SCHEMATIC DIAGRAM (For M251A, AW)



SYS. CON./TIMER SCHEMATIC DIAGRAM (For M250A)



REAR JACK SCHEMATIC DIAGRAM (For M250A)

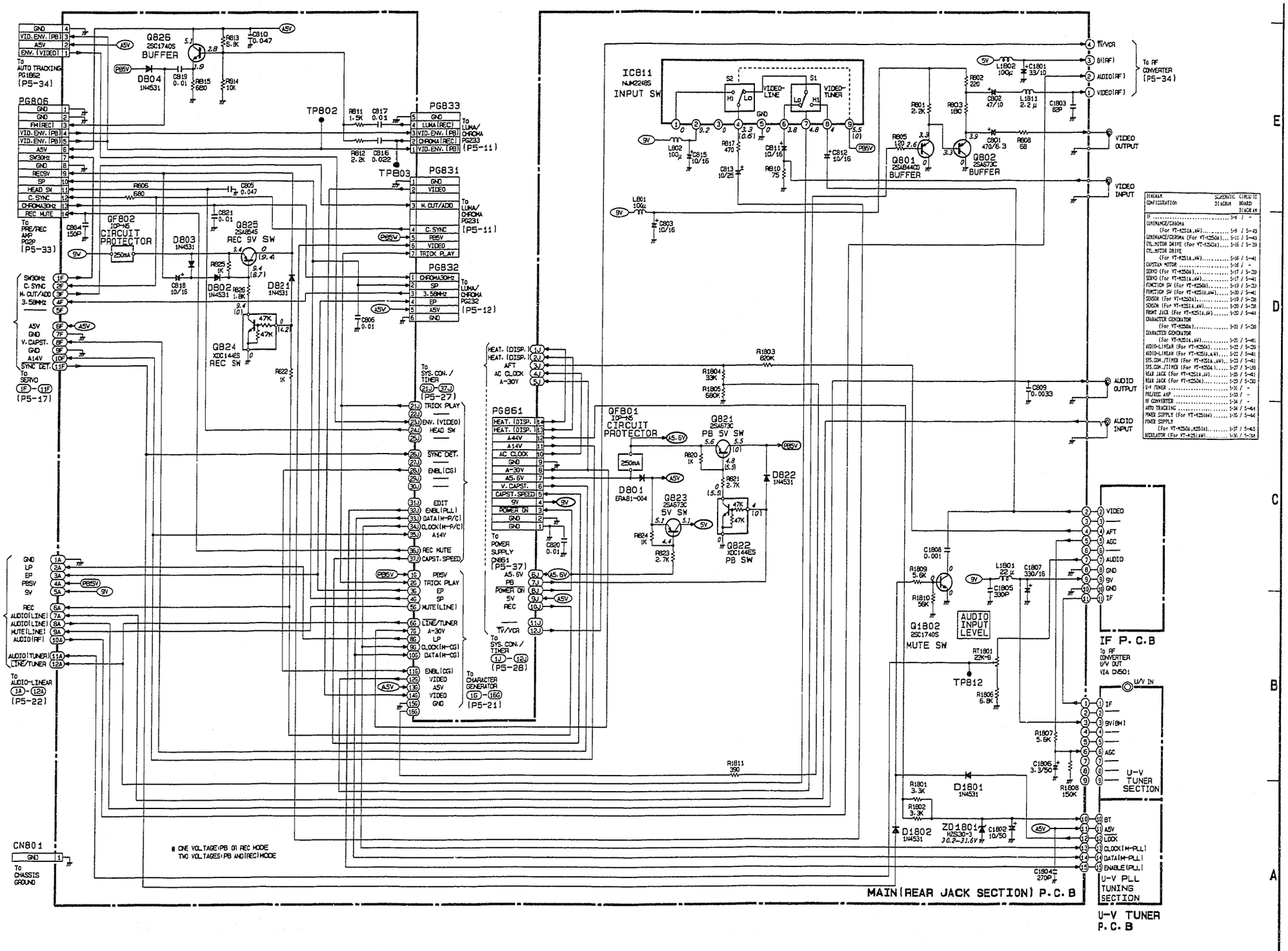


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
IF	5-9	/ -
LUMINANCE/CHROMA (For VT-M251A,AW)	5-9	/ 5-43
LUMINANCE/CHROMA (For VT-M250A)	5-11	/ 5-43
CYL.MOTOR DRIVE (For VT-M250A)	5-16	/ 5-39
CYL.MOTOR DRIVE (For VT-M251A,AW)	5-16	/ 5-41
CAPSTAN MOTOR	5-16	/ -
SERVO (For VT-M250A)	5-17	/ 5-39
SERVO (For VT-M251A,AW)	5-17	/ 5-41
FUNCTION SW (For VT-M250A)	5-19	/ 5-39
FUNCTION SW (For VT-M251A,AW)	5-20	/ 5-41
SENSOR (For VT-M250A)	5-19	/ 5-39
SENSOR (For VT-M251A,AW)	5-20	/ 5-39
FRONT JACK (For VT-M251A,AW)	5-20	/ 5-41
CHARACTER GENERATOR (For VT-M250A)	5-21	/ 5-39
CHARACTER GENERATOR (For VT-M251A,AW)	5-21	/ 5-41
AUDIO-LINEAR (For VT-M250A)	5-22	/ 5-39
AUDIO-LINEAR (For VT-M251A,AW)	5-22	/ 5-41
SYS.CON./TIMER (For VT-M251A,AW)	5-23	/ 5-41
SYS.CON./TIMER (For VT-M250A)	5-27	/ 5-39
REAR JACK (For VT-M251A,AW)	5-25	/ 5-41
REAR JACK (For VT-M250A)	5-29	/ 5-39
U-V TUNER	5-31	/ -
PRE/REC AMP	5-33	/ -
RF CONVERTER	5-34	/ -
AUTO TRACKING	5-34	/ 5-44
POWER SUPPLY (For VT-M251AW)	5-35	/ 5-44
POWER SUPPLY (For VT-M250A,M251A)	5-37	/ 5-43
REGULATOR (For VT-M251AW)	5-30	/ 5-34

U-V TUNER SCHEMATIC DIAGRAM

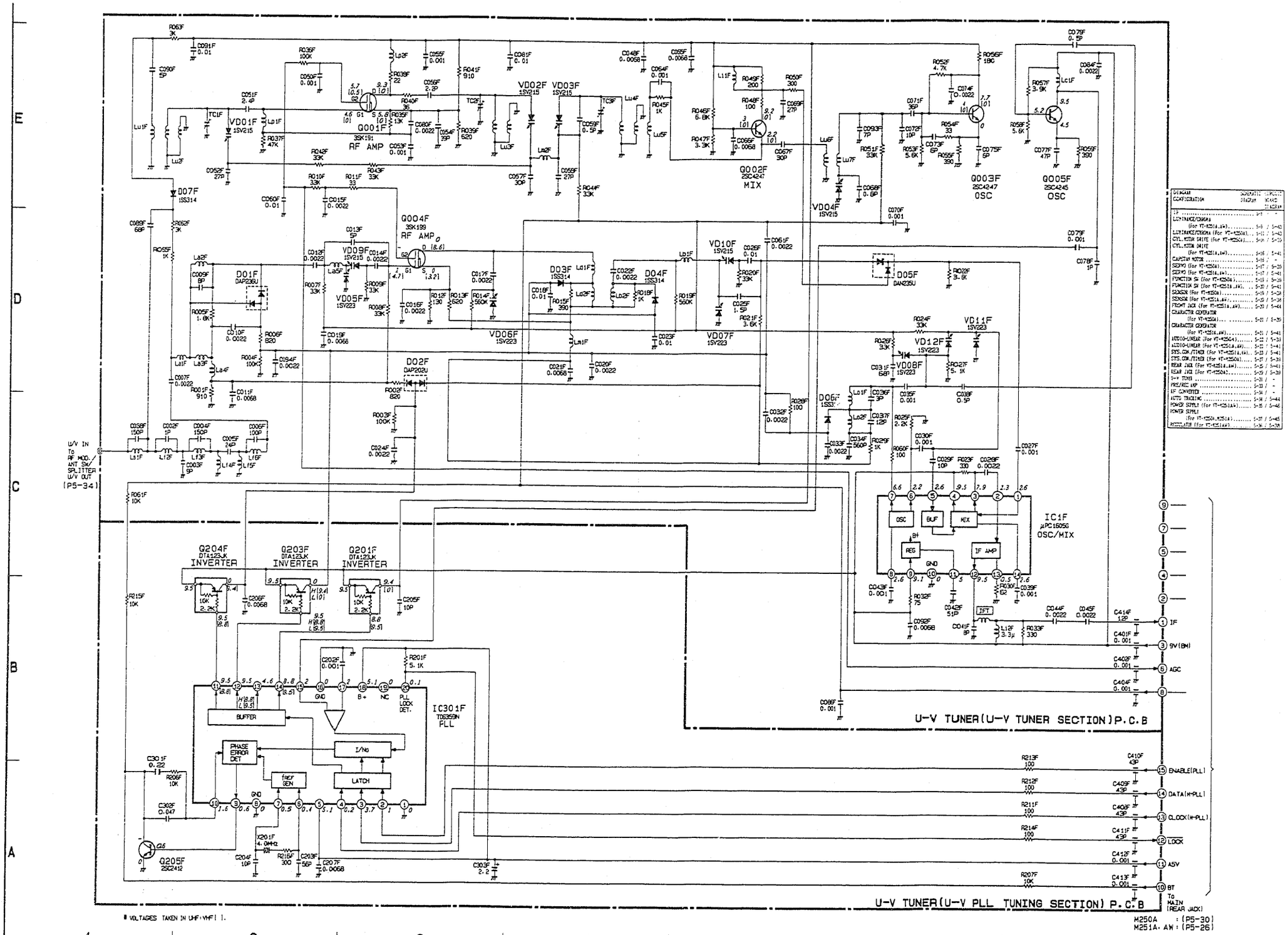


DIAGRAM / CONFIGURATION	SCHEMATIC DIAGRAM	PC BOARD DIAGRAM
I/F	5-1	
LUMINANCE/CHROMA		
(For VT-M251A,AW)	5-9	5-43
LUMINANCE/CHROMA (For VT-M250A)	5-11	5-42
CYL.MOTOR DRIVE (For VT-M250A)	5-14	5-42
CYL.MOTOR DRIVE		
(For VT-M251A,AW)	5-16	5-41
CAPSTAN MOTOR	5-16	-
SERVO (For VT-M250A)	5-17	5-38
SERVO (For VT-M251A,AW)	5-17	5-41
FUNCTION SW (For VT-M250A)	5-18	5-39
FUNCTION SW (For VT-M251A,AW)	5-20	5-41
SENSOR (For VT-M250A)	5-19	5-38
SENSOR (For VT-M251A,AW)	5-20	5-38
FRONT JACK (For VT-M251A,AW)	5-20	5-44
CHARACTER GENERATOR		
(For VT-M250A)	5-21	5-39
CHARACTER GENERATOR		
(For VT-M251A,AW)	5-21	5-41
VIDEO-LINEAR (For VT-M250A)	5-22	5-38
VIDEO-LINEAR (For VT-M251A,AW)	5-22	5-41
SYS.CON./TIMER (For VT-M251A,AW)	5-23	5-41
SYS.CON./TIMER (For VT-M250A)	5-23	5-39
REAR JACK (For VT-M251A,AW)	5-25	5-43
REAR JACK (For VT-M250A)	5-29	5-39
V+Y TONE	5-30	-
PRE/REC AMP	5-33	-
RF CONVERTER	5-34	-
AUTO TRACKING	5-34	5-44
POWER SUPPLY (For VT-M250A)	5-35	5-46
POWER SUPPLY		
(For VT-M250A,M251A)	5-37	5-45
REGULATOR (For VT-M251AW)	5-36	5-39

PRE/REC AMP SCHEMATIC DIAGRAM

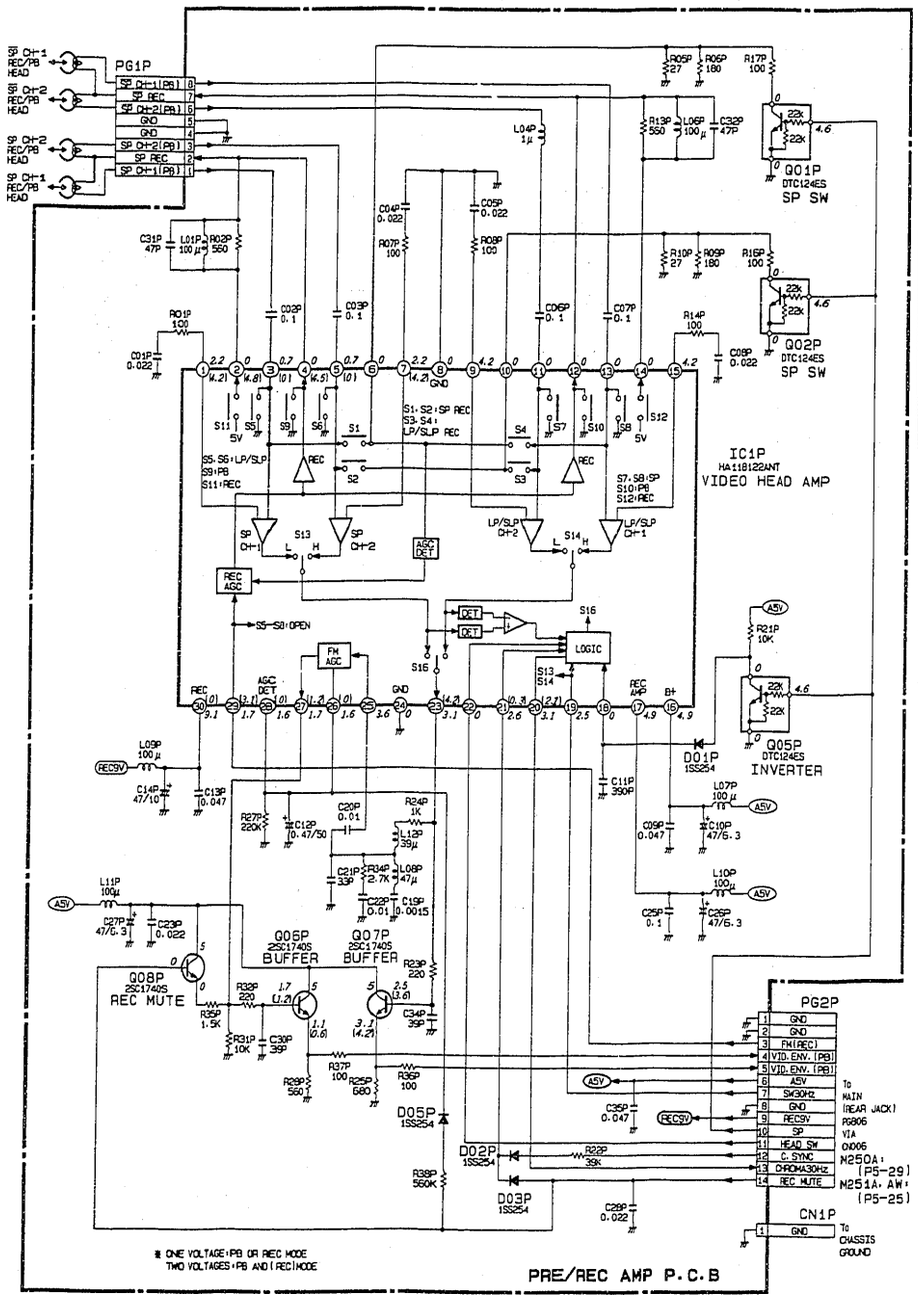
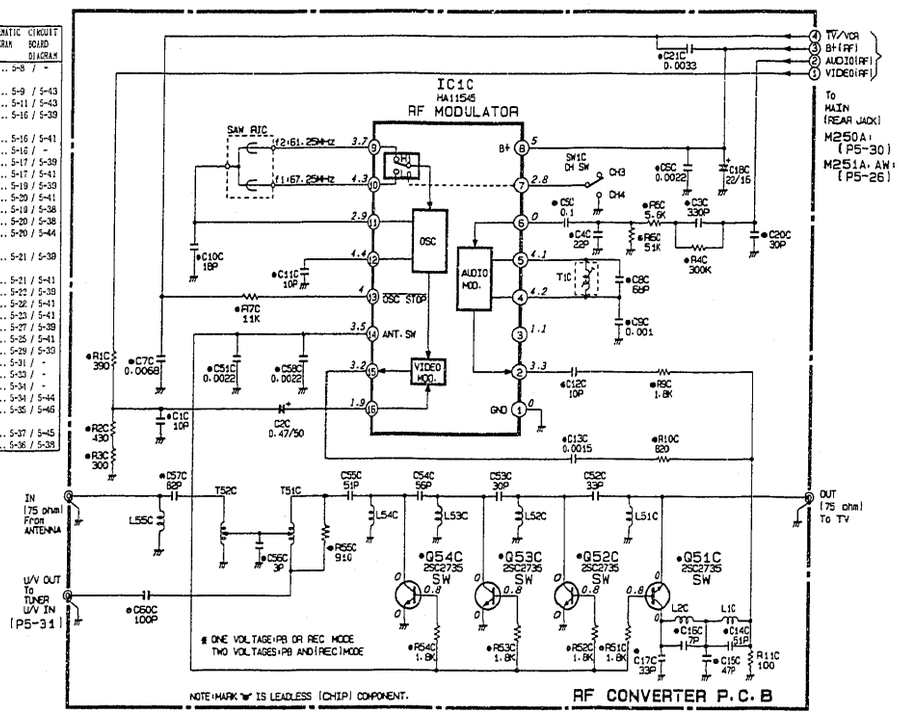
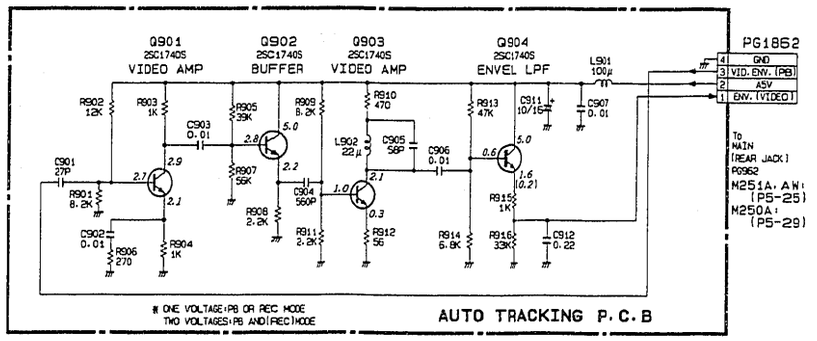


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
IF	5-8	/ -
LUMINANCE/CHROMA (for VT-M251A,AW)	5-9	/ 5-43
LUMINANCE/CHROMA (For VT-M250A)	5-11	/ 5-43
CYL.MOTOR DRIVE (For VT-M250A)	5-16	/ 5-39
CYL.MOTOR DRIVE (For VT-M251A,AW)	5-16	/ 5-41
CAPSTAN MOTOR	5-16	/ -
SERVO (For VT-M250A)	5-17	/ 5-39
SERVO (For VT-M251A,AW)	5-17	/ 5-41
FUNCTION SW (For VT-M250A)	5-19	/ 5-39
FUNCTION SW (For VT-M251A,AW)	5-20	/ 5-41
SENSOR (For VT-M250A)	5-19	/ 5-38
SENSOR (For VT-M251A,AW)	5-20	/ 5-38
FRONT JACK (For VT-M251A,AW)	5-20	/ 5-44
CHARACTER GENERATOR (For VT-M250A)	5-21	/ 5-39
CHARACTER GENERATOR (For VT-M251A,AW)	5-21	/ 5-41
AUDIO-LINEAR (For VT-M250A)	5-22	/ 5-39
AUDIO-LINEAR (For VT-M251A,AW)	5-22	/ 5-41
SYS.CONT./TIMER (For VT-M251A,AW)	5-23	/ 5-41
SYS.CONT./TIMER (For VT-M250A)	5-27	/ 5-39
REAR JACK (For VT-M251A,AW)	5-25	/ 5-41
REAR JACK (For VT-M250A)	5-29	/ 5-39
U-V TUNER	5-31	/ -
PRE/REC AMP	5-33	/ -
RF CONVERTER	5-34	/ -
AUTO TRACKING	5-34	/ 5-44
POWER SUPPLY (For VT-M251AW)	5-35	/ 5-46
POWER SUPPLY (For VT-M250A,M251A)	5-37	/ 5-45
REGULATOR (For VT-M251AW)	5-36	/ 5-38

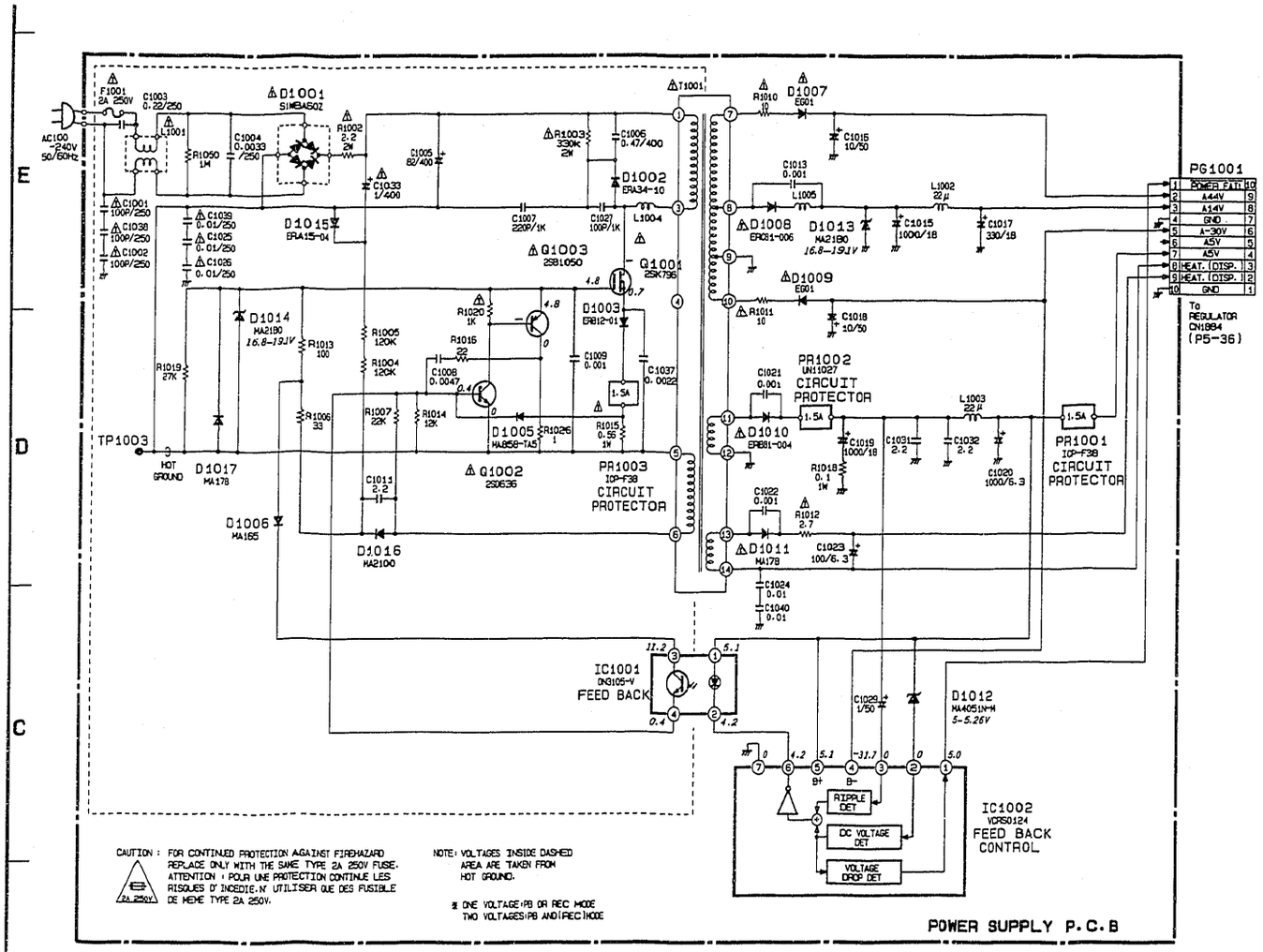
RF CONVERTER SCHEMATIC DIAGRAM



AUTO TRACKING SCHEMATIC DIAGRAM



POWER SUPPLY SCHEMATIC DIAGRAM (For M251AW)



CAUTION : FOR CONTINUED PROTECTION AGAINST FIREHAZARD REPLACE ONLY WITH THE SAME TYPE 2A 250V FUSE. ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES D'INCEDIE.N UTILISER QUE DES FUSIBLE DE MEME TYPE 2A 250V.

NOTE: VOLTAGES INSIDE DASHED AREA ARE TAKEN FROM HOT GROUND.

* ONE VOLTAGE:PB OR REC MODE
TWO VOLTAGES:PB AND REC MODE

POWER SUPPLY P.C.B

REGULATOR SCHEMATIC DIAGRAM (For M251AW)

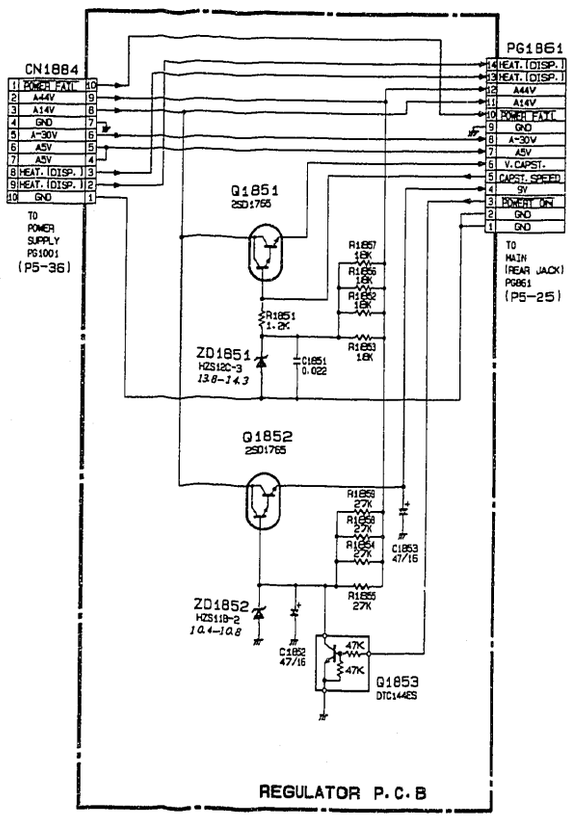
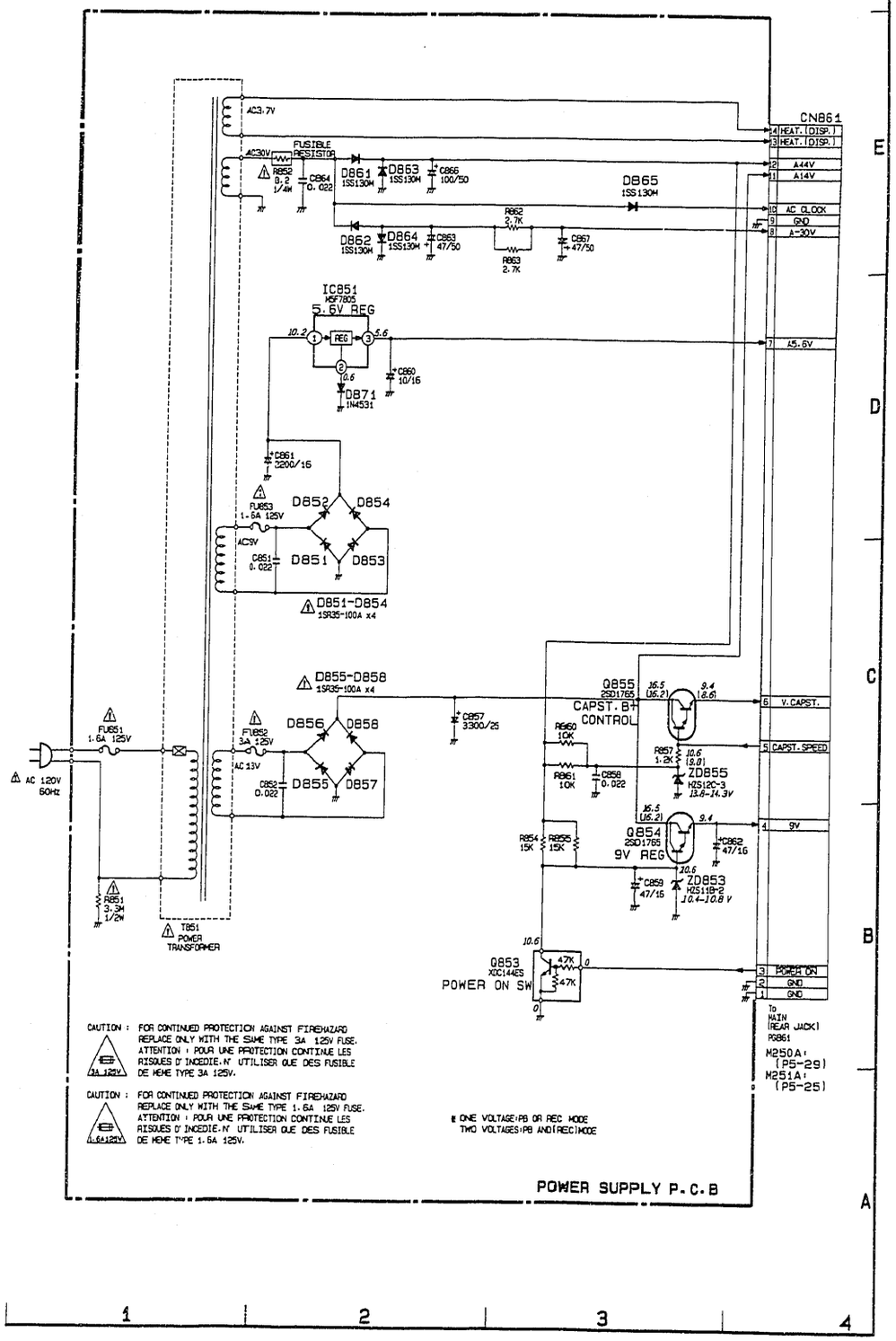


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
IF	5-8	-
LUMINANCE/CHROMA (For VT-M251A,AW)	5-9	5-43
LUMINANCE/CHROMA (For VT-M250A)	5-11	5-43
CYL.MOTOR DRIVE (For VT-M250A)	5-16	5-39
CYL.MOTOR DRIVE (For VT-M251A,AW)	5-16	5-41
CAPSTAN MOTOR	5-16	-
SERVO (For VT-M250A)	5-17	5-39
SERVO (For VT-M251A,AW)	5-17	5-41
FUNCTION SW (For VT-M250A)	5-19	5-39
FUNCTION SW (For VT-M251A,AW)	5-20	5-41
SENSOR (For VT-M250A)	5-19	5-38
SENSOR (For VT-M251A,AW)	5-20	5-38
FRONT JACK (For VT-M251A,AW)	5-20	5-44
CHARACTER GENERATOR (For VT-M250A)	5-21	5-39
CHARACTER GENERATOR (For VT-M251A,AW)	5-21	5-41
AUDIO-LINEAR (For VT-M250A)	5-22	5-39
AUDIO-LINEAR (For VT-M251A,AW)	5-22	5-41
SYS.CON./TIMER (For VT-M251A,AW)	5-23	5-41
SYS.CON./TIMER (For VT-M250A)	5-27	5-39
REAR JACK (For VT-M251A,AW)	5-25	5-41
REAR JACK (For VT-M250A)	5-29	5-39
U-V TUNER	5-31	-
PRE/REC AMP	5-33	-
RF CONVERTER	5-34	-
AUTO TRACKING	5-34	5-44
POWER SUPPLY (For VT-M251AW)	5-35	5-45
POWER SUPPLY (For VT-M250A,M251A)	5-37	5-45
REGULATOR (For VT-M251AW)	5-36	5-38

POWER SUPPLY SCHEMTIC DIAGRAM
(For M250A, M251A)



SENSER CIRCUIT BOARD DIAGRAM

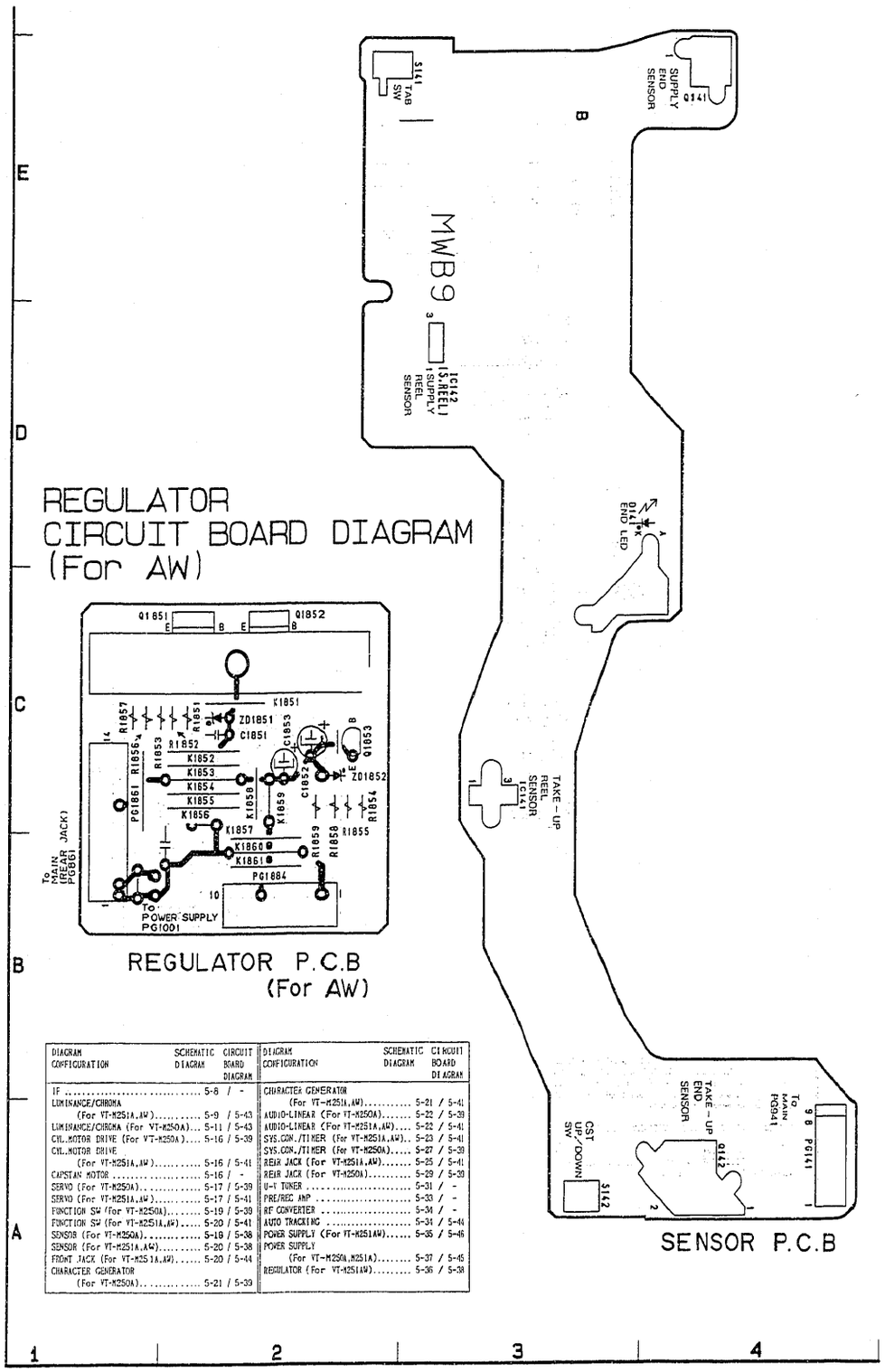
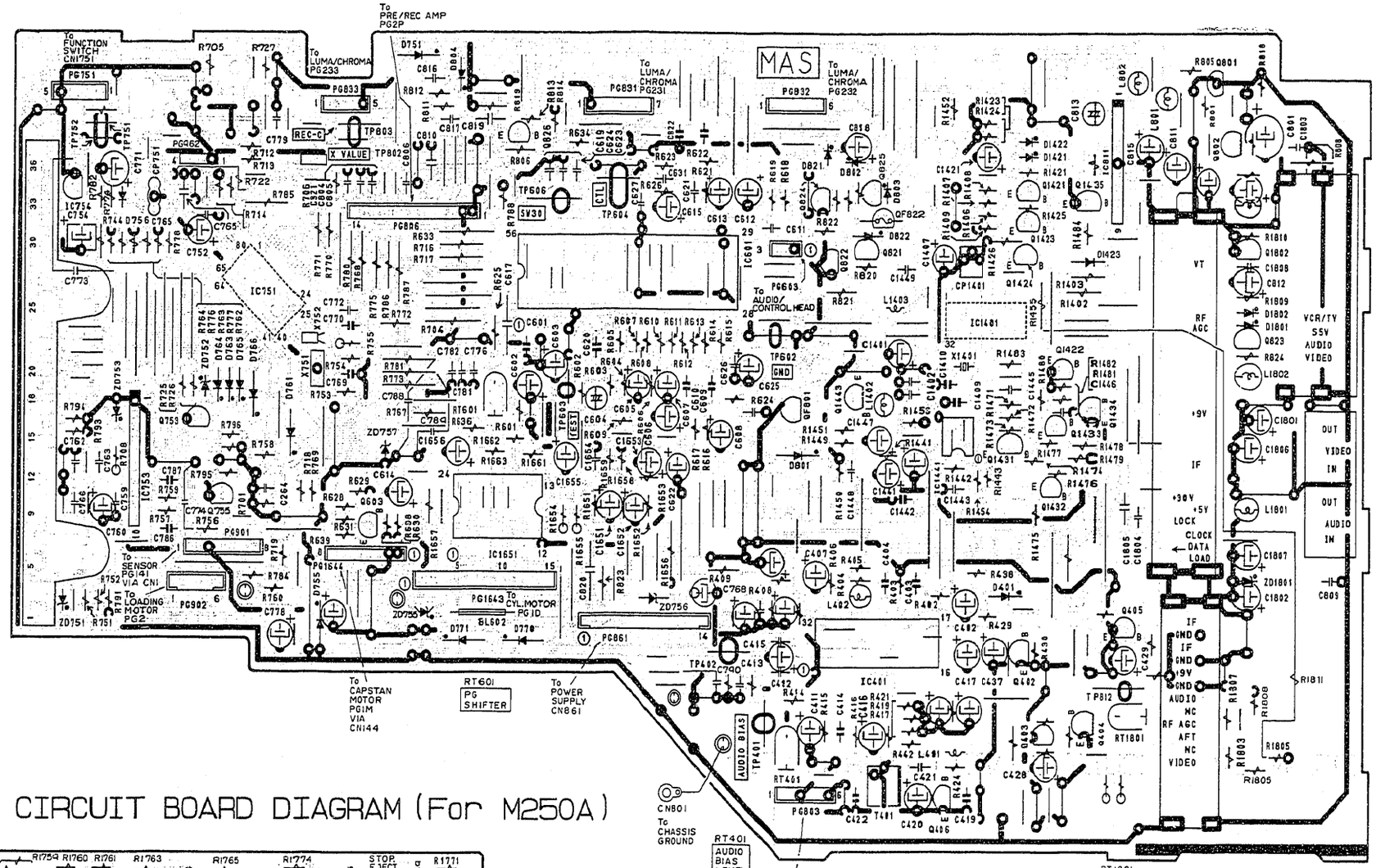


DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
IF	5-8	/ -
LUMINANCE/CHROMA (For VT-M251A,AW)	5-9	/ 5-43
LUMINANCE/CHROMA (For VT-M250A)	5-11	/ 5-43
CYL.MOTOR DRIVE (For VT-M250A)	5-16	/ 5-39
CYL.MOTOR DRIVE (For VT-M251A,AW)	5-16	/ 5-41
CAPSTAN MOTOR	5-16	/ -
SERVO (For VT-M250A)	5-17	/ 5-39
SERVO (For VT-M251A,AW)	5-17	/ 5-41
FUNCTION SW (For VT-M250A)	5-19	/ 5-39
FUNCTION SW (For VT-M251A,AW)	5-20	/ 5-41
SENSOR (For VT-M250A)	5-18	/ 5-38
SENSOR (For VT-M251A,AW)	5-20	/ 5-38
FRONT JACK (For VT-M251A,AW)	5-20	/ 5-44
CHARACTER GENERATOR (For VT-M250A)	5-21	/ 5-39

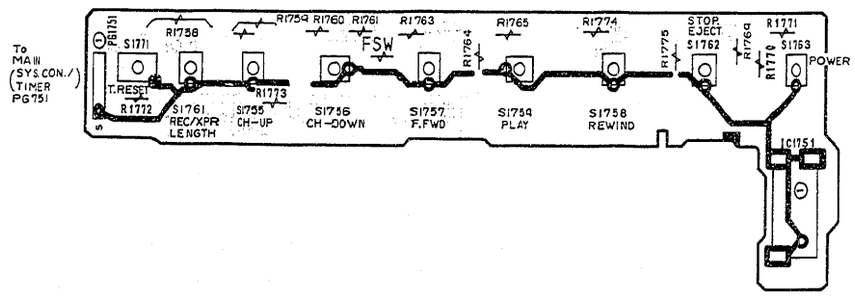
DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
CHARACTER GENERATOR (For VT-M251A,AW)	5-21	/ 5-41
AUDIO-LINEAR (For VT-M250A)	5-22	/ 5-39
AUDIO-LINEAR (For VT-M251A,AW)	5-22	/ 5-41
SYS.CON./TIMER (For VT-M251A,AW)	5-23	/ 5-41
SYS.CON./TIMER (For VT-M250A)	5-27	/ 5-39
REAR JACK (For VT-M251A,AW)	5-25	/ 5-41
REAR JACK (For VT-M250A)	5-29	/ 5-39
U-V TUNER	5-31	/ -
PRE/REC AMP	5-33	/ -
RF CONVERTER	5-34	/ -
AUTO TRACKING	5-34	/ 5-44
POWER SUPPLY (For VT-M251AW)	5-35	/ 5-46
POWER SUPPLY (For VT-M250A,M251A)	5-37	/ 5-45
REGULATOR (For VT-M251AW)	5-36	/ 5-38

MAIN CIRCUIT BOARD DIAGRAM (For M250A)



MAIN P.C.B
(For M250A)

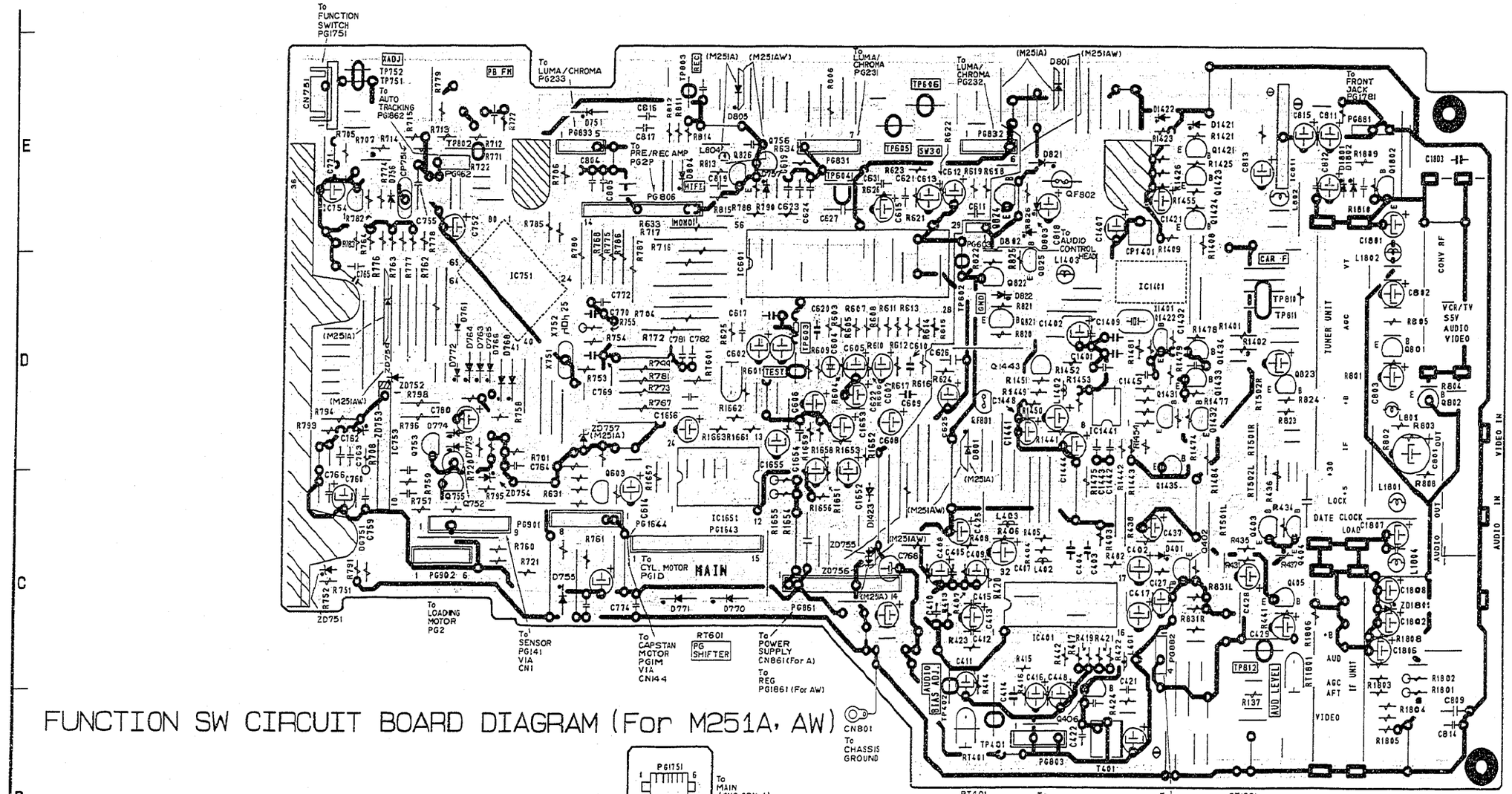
FUNCTION SW CIRCUIT BOARD DIAGRAM (For M250A)



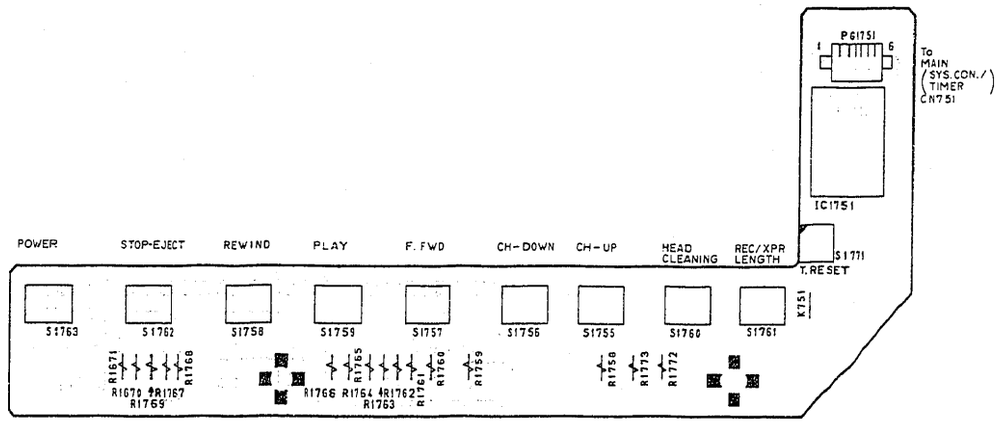
FUNCTION SW P.C.B
(For M250A)

DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
IF	5-8	/ -
LUMINANCE/CHROMA (For VT-M251A,AW)	5-9	/ 5-43
LUMINANCE/CHROMA (For VT-M250A)	5-11	/ 5-43
CYL.MOTOR DRIVE (For VT-M250A)	5-16	/ 5-39
CYL.MOTOR DRIVE (For VT-M251A,AW)	5-16	/ 5-41
CAPSTAN MOTOR	5-16	/ -
SERVO (For VT-M250A)	5-17	/ 5-39
SERVO (For VT-M251A,AW)	5-17	/ 5-41
FUNCTION SW (For VT-M250A)	5-19	/ 5-39
FUNCTION SW (For VT-M251A,AW)	5-20	/ 5-41
SENSOR (For VT-M250A)	5-19	/ 5-38
SENSOR (For VT-M251A,AW)	5-20	/ 5-38
FRONT JACK (For VT-M251A,AW)	5-20	/ 5-44
CHARACTER GENERATOR (For VT-M250A)	5-21	/ 5-38
CHARACTER GENERATOR (For VT-M251A,AW)	5-21	/ 5-41
AUDIO-LINEAR (For VT-M250A)	5-22	/ 5-39
AUDIO-LINEAR (For VT-M251A,AW)	5-22	/ 5-41
SYS.CON./TIMER (For VT-M251A,AW)	5-23	/ 5-41
SYS.CON./TIMER (For VT-M250A)	5-27	/ 5-39
REAR JACK (For VT-M251A,AW)	5-25	/ 5-41
REAR JACK (For VT-M250A)	5-29	/ 5-39
U-V TUNER	5-31	/ -
PRE/REC AMP	5-33	/ -
RF CONVERTER	5-34	/ -
AUTO TRACKING	5-34	/ 5-44
POWER SUPPLY (For VT-M251AW)	5-35	/ 5-46
POWER SUPPLY (For VT-M250A,M251A)	5-37	/ 5-45
REGULATOR (For VT-M251AW)	5-36	/ 5-38

MAIN CIRCUIT BOARD DIAGRAM (For M251A, AW)


To FUNCTION SWITCH PG1751
To LUMA/CHROMA PG233
To AUTO TRACKING PG862
To PRE/REC AMP PG2P
To LUMA/CHROMA PG231
To LUMA/CHROMA PG232
To FRONT JACK PG1781
To AUDIO CONTROL HEAD
To LOADING MOTOR PG2
To SENSOR PG141 VIA CN1
To CAPSTAN MOTOR PGIM VIA CN144
To CYL. MOTOR PG1D
To POWER SUPPLY CN861(For A)
To REG PG1861 (For AW)
MAIN
RT601 PG SHIFTER
RT401 AUDIO BIAS LEVEL
To AUDIO REC/PB AUDIO-/ FULL-ERASE HEAD
To FRONT JACK PG1782
RT1801 AUDIO INPUT LEVEL
CN801 To CHASSIS GROUND
MAIN P.C.B (For M251A,AW)

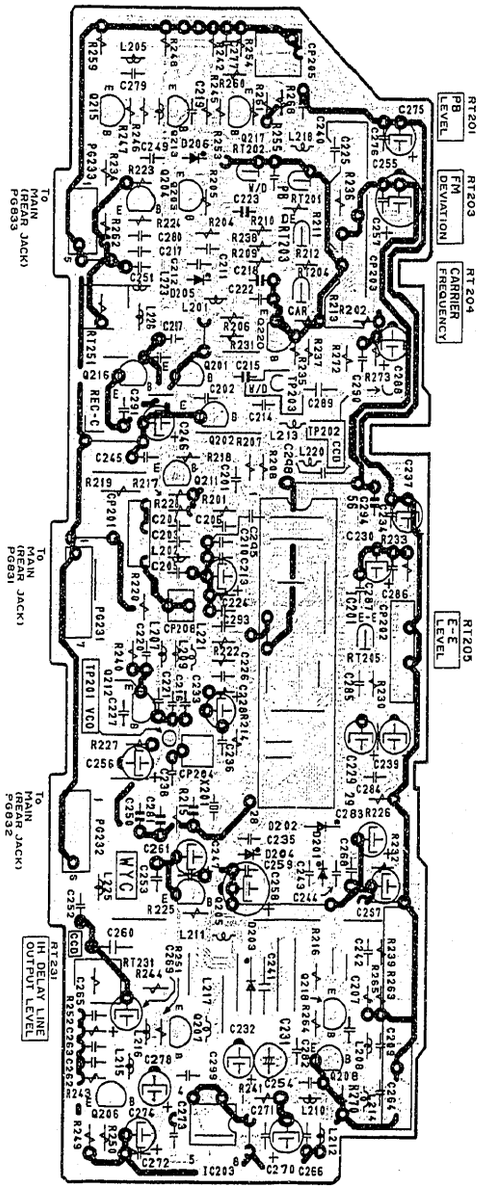
FUNCTION SW CIRCUIT BOARD DIAGRAM (For M251A, AW)



FUNCTION SW P.C.B (For M251A,AW)

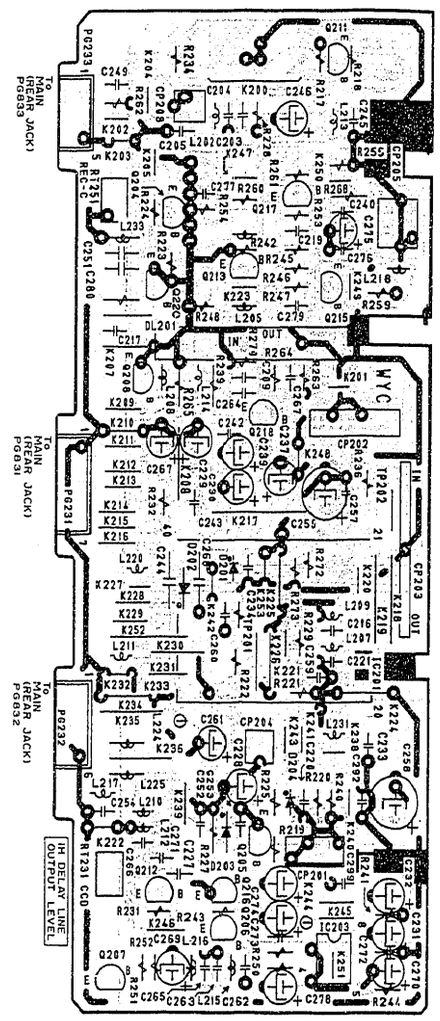
DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
IF	5-8	/ -
LUMINANCE/CHROMA (For VT-M251A,AW)	5-9	/ 5-43
LUMINANCE/CHROMA (For VT-M250A)	5-11	/ 5-43
CYL.MOTOR DRIVE (For VT-M250A)	5-15	/ 5-39
CYL.MOTOR DRIVE (For VT-M251A,AW)	5-16	/ 5-41
CAPSTAN MOTOR	5-16	/ -
SERVO (For VT-M250A)	5-17	/ 5-39
SERVO (For VT-M251A,AW)	5-17	/ 5-41
FUNCTION SW (For VT-M250A)	5-19	/ 5-39
FUNCTION SW (For VT-M251A,AW)	5-20	/ 5-41
SENSOR (For VT-M250A)	5-19	/ 5-38
SENSOR (For VT-M251A,AW)	5-20	/ 5-38
FRONT JACK (For VT-M251A,AW)	5-30	/ 5-44
CHARACTER GENERATOR (For VT-M250A)	5-21	/ 5-39
CHARACTER GENERATOR (For VT-M251A,AW)	5-21	/ 5-41
AUDIO-LINEAR (For VT-M250A)	5-22	/ 5-39
AUDIO-LINEAR (For VT-M251A,AW)	5-22	/ 5-41
SYS.CON./TIMER (For VT-M251A,AW)	5-23	/ 5-41
SYS.CON./TIMER (For VT-M250A)	5-27	/ 5-39
REAR JACK (For VT-M251A,AW)	5-25	/ 5-41
REAR JACK (For VT-M250A)	5-29	/ 5-39
U-V TUNER	5-31	/ -
FRE/REC AMP	5-33	/ -
RF CONVERTER	5-34	/ -
AUTO TRACKING	5-34	/ 5-44
POWER SUPPLY (For VT-M251A)	5-35	/ 5-46
POWER SUPPLY (For VT-M250A,M251A)	5-37	/ 5-45
REGULATOR (For VT-M251A)	5-36	/ 5-38

LUMINANCE/CHROMA CIRCUIT BOARD DIAGRAM (For M250A)



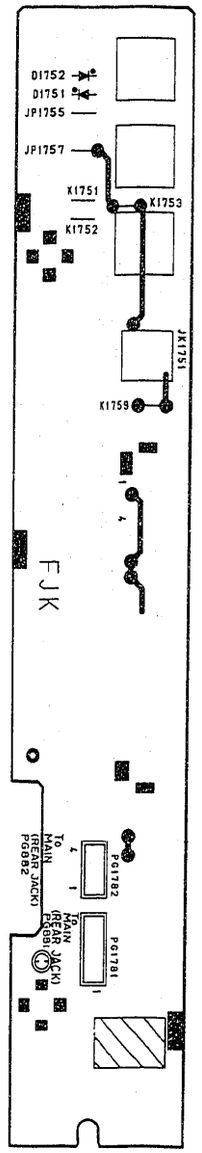
LUMINANCE/CHROMA P.C.B (For M250A)

LUMINANCE/CHROMA CIRCUIT BOARD DIAGRAM (For M251A, AW)



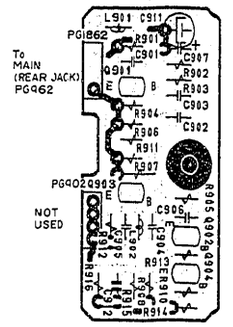
LUMINANCE/CHROMA P.C.B (For M251A, AW)

FRONT JACK CIRCUIT BOARD DIAGRAM (For M251A, AW)



FRONT JACK P.C.B (For M251A, AW)

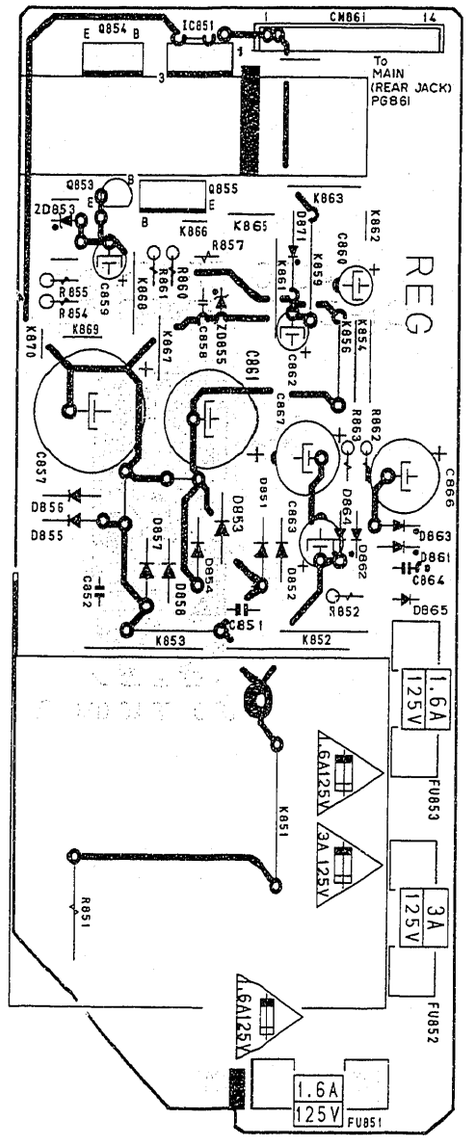
AUTO TRACKING CIRCUIT BOARD DIAGRAM



AUTO TRACKING P.C.B

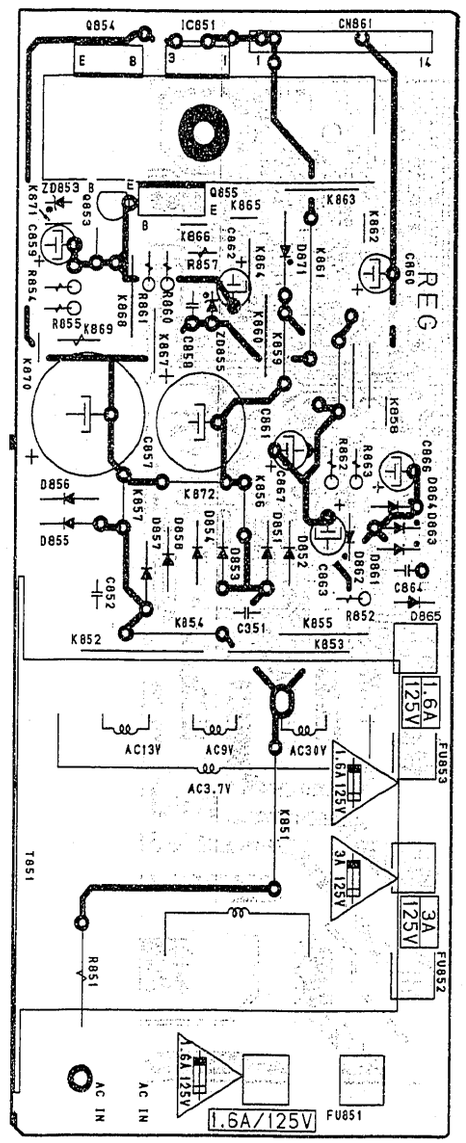
DIAGRAM CONFIGURATION	SCHEMATIC DIAGRAM	CIRCUIT BOARD DIAGRAM
IF	5-8	/ -
LUMINANCE/CHROMA (For VT-M251A,AW)	5-8	/ 5-43
LUMINANCE/CHROMA (For VT-M250A)	5-11	/ 5-43
CYL.MOTOR DRIVE (For VT-M250A)	5-16	/ 5-39
CYL.MOTOR DRIVE (For VT-M251A,AW)	5-16	/ 5-41
CAPSTAN MOTOR	5-16	/ -
SERVO (For VT-M250A)	5-17	/ 5-39
SERVO (For VT-M251A,AW)	5-17	/ 5-41
FUNCTION SW (For VT-M250A)	5-19	/ 5-39
FUNCTION SW (For VT-M251A,AW)	5-20	/ 5-41
SENSOR (For VT-M250A)	5-19	/ 5-38
SENSOR (For VT-M251A,AW)	5-20	/ 5-38
FRONT JACK (For VT-M251A,AW)	5-20	/ 5-44
CHARACTER GENERATOR (For VT-M250A)	5-21	/ 5-39
CHARACTER GENERATOR (For VT-M251A,AW)	5-21	/ 5-41
AUDIO-LINEAR (For VT-M250A)	5-22	/ 5-39
AUDIO-LINEAR (For VT-M251A,AW)	5-22	/ 5-41
SYS.CON./TIMER (For VT-M251A,AW)	5-23	/ 5-41
SYS.CON./TIMER (For VT-M250A)	5-27	/ 5-39
REAR JACK (For VT-M251A,AW)	5-25	/ 5-41
REAR JACK (For VT-M250A)	5-29	/ 5-39
U-V TUNER	5-31	/ -
PRE/REC AMP	5-33	/ -
RF CONVERTER	5-34	/ -
AUTO TRACKING	5-34	/ 5-44
POWER SUPPLY (For VT-M251AN)	5-35	/ 5-45
POWER SUPPLY (For VT-M250A,M251A)	5-37	/ 5-45
REGULATOR (For VT-M251AW)	5-36	/ 5-38

POWER SUPPLY CIRCUIT BOARD DIAGRAM (For M250A)



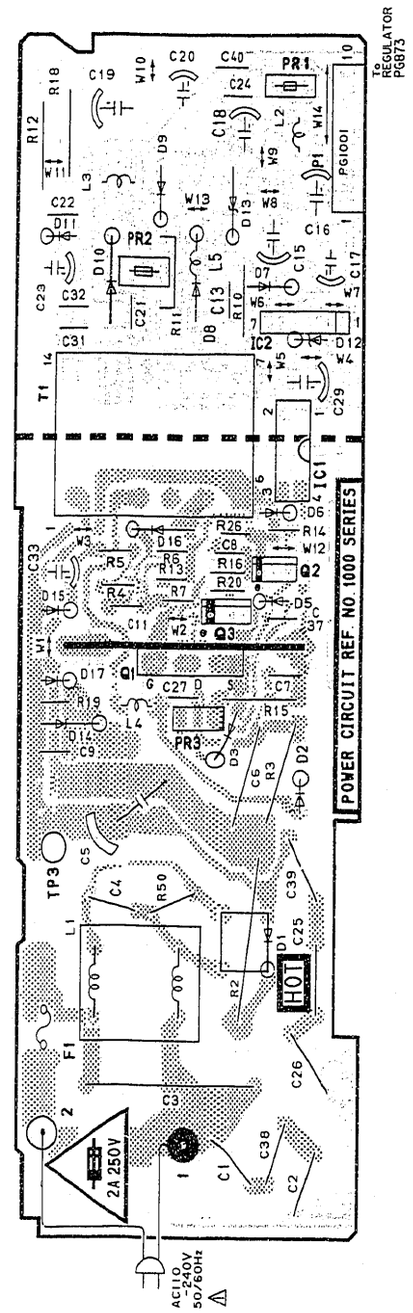
POWER SUPPLY P.C.B (For M250A)

POWER SUPPLY CIRCUIT BOARD DIAGRAM (For M251A)



POWER SUPPLY P.C.B (For M251A)

POWER SUPPLY CIRCUIT BOARD DIAGRAM (For AW)



POWER SUPPLY P.C.B (For AW)

REPLACEMENT PARTS LIST

ELECTRICAL PARTS LIST (VT-M250A)

SYMBOL-No	P-No	DESCRIPTION
		CAPACITORS
C 201	0890021	CERAMIC DISC 82PF+-10% 50V
C 202	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 203	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 204	0890013	CERAMIC DISC 22PF+-5% 50V
C 205	0890023	CERAMIC DISC 120PF+-10% 50V
C 206	0890018	CERAMIC DISC 56PF+-50% 50V
C 207	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 208	0890012	CERAMIC DISC 18PF+-5% 50V
C 209	0890011	CERAMIC DISC 15PF+-5% 50V
C 210	0890035	CERAMIC DISC 1000PF 50V
C 211	0890015	CERAMIC DISC 33PF+-50% 50V
C 212	0890013	CERAMIC DISC 22PF+-5% 50V
C 214	0890021	CERAMIC DISC 82PF+-10% 50V
C 215	0208526	CERAMIC DISC 560PF+-5% 50V
C 216	0890016	CERAMIC DISC 39PF+-50% 50V
C 217	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 218	0890075	CERAMIC DISC 120PF+-5% 50V
C 219	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 220	0890023	CERAMIC DISC 120PF+-10% 50V
C 221	0890016	CERAMIC DISC 39PF+-50% 50V
C 222	0890015	CERAMIC DISC 33PF+-50% 50V
C 223	0890107	CERAMIC DISC 4PF+-0.25% 50V
C 224	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 225	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 226	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 227	0890038	CERAMIC DISC 3300PF+-20% 16V
C 233	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 234	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 235	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 236	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C 238	0890035	CERAMIC DISC 1000PF 50V
C 240	0890004	CERAMIC DISC 3.3PF+-10% 50V
C 241	0890035	CERAMIC DISC 1000PF 50V
C 242	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 243	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 244	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 245	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 247	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 249	0890031	CERAMIC DISC 470PF+-10% 50V
C 250	0890105	CERAMIC DISC 2.0PF+-0.25% 50V
C 251	0890016	CERAMIC DISC 39PF+-50% 50V
C 252	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 253	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 254	0890017	CERAMIC DISC 47PF+-5% 50V
C 257	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 259	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 260	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 262	0890013	CERAMIC DISC 22PF+-5% 50V
C 263	0890021	CERAMIC DISC 82PF+-10% 50V
C 264	0890014	CERAMIC DISC 27PF+-50% 50V
C 265	0890013	CERAMIC DISC 22PF+-5% 50V
C 266	0890017	CERAMIC DISC 47PF+-5% 50V
C 268	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 271	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 272	0890035	CERAMIC DISC 1000PF 50V
C 273	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 277	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 279	0890018	CERAMIC DISC 56PF+-50% 50V
C 280	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 281	0890121	CERAMIC DISC 33PF+-5% 50V
C 282	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 284	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 285	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 286	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 287	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 289	0890038	CERAMIC DISC 3300PF+-20% 16V
C 290	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 291	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 292	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 293	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 297	0890016	CERAMIC DISC 39PF+-50% 50V
C 299	0890034	CERAMIC DISC 820PF+-10% 5V
C 405	0890042	CERAMIC DISC 8200PF+-20% 16V
C 410	0890029	CERAMIC DISC 390PF+-10% 50V
C 412	0890035	CERAMIC DISC 1000PF 50V
C 415	0890038	CERAMIC DISC 3300PF+-20% 16V
C 419	0890039	CERAMIC DISC 4700PF+-20% 16V
C 421	0890037	CERAMIC DISC 2200PF+-20% 16V
C 422	0204271	POLYESTER FILM 8200PF+-5% 100V
C 611	0890035	CERAMIC DISC 1000PF 50V
C 617	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 619	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 621	0890026	CERAMIC DISC 220PF+-10% 50V
C 623	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 624	0890024	CERAMIC DISC 150PF+-10% 50V
C 626	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 627	0890038	CERAMIC DISC 3300PF+-20% 16V
C 631	0890014	CERAMIC DISC 27PF+-50% 50V
C 753	0890037	CERAMIC DISC 2200PF+-20% 16V
C 755	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 759	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 761	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 762	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 763	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 764	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 765	0890035	CERAMIC DISC 1000PF 50V
C 769	0890118	CERAMIC DISC 22PF+-5% 50V
C 770	0890118	CERAMIC DISC 22PF+-5% 50V
C 772	0890102	CERAMIC DISC 0.022UF+80-20% 50V
C 776	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 777	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 779	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 804	0890024	CERAMIC DISC 150PF+-10% 50V
C 805	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C 806	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 809	0890038	CERAMIC DISC 3300PF+-20% 16V
C 810	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C 816	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 817	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 819	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 820	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 821	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 851	0890102	CERAMIC DISC 0.022UF+80-20% 50V
C 852	0890102	CERAMIC DISC 0.022UF+80-20% 50V
C 857	0256865	ELECTROLYTIC 3300UF 25V
C 858	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 861	0256861	ELECTROLYTIC 2200UF 16V
C 901	0890014	CERAMIC DISC 27PF+-50% 50V
C 902	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 903	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 904	0890032	CERAMIC 560PF+-10% 50V
C 905	0890019	CERAMIC DISC 68PF+-50% 50V
C 906	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 907	0890043	CERAMIC DISC 0.01UF+-20% 16V
C1402	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C1409	0890116	CERAMIC DISC 15PF+-5% 50V
C1410	0890115	CERAMIC DISC 12PF+-5% 50V
C1443	0890013	CERAMIC DISC 22PF+-5% 50V

SYMBOL-No	P-No	DESCRIPTION
C1446	0890038	CERAMIC DISC 3300PF+-20% 16V
C1448	0890031	CERAMIC DISC 470PF+-10% 50V
C1449	0890022	CERAMIC DISC 100PF+-10% 50V
C1654	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C1803	0890073	CERAMIC DISC 82PF+-5% 50V
C1804	0890027	CERAMIC DISC 270PF+-10% 50V
C1805	0890028	CERAMIC DISC 330PF+-10% 50V
C1808	0890035	CERAMIC DISC 1000PF 50V
		RESISTORS
R 705	0101765	CHIP RESISTOR 10KOHM+-1% 1/8W
⚠ R 852	0170477	FUSE RESISTOR 8.2OHM+-5% 1/4W
R1443	0101736	METAL FILM 120KOHM 1/8W
R1454	0101765	CHIP RESISTOR 10KOHM+-1% 1/8W
RT 201	5007447	SEMI VARIABLE 10KOHM
RT 202	5007435	SEMI VARIABLE 10KOHM
RT 203	5007435	SEMI VARIABLE 10KOHM
RT 204	5007435	SEMI VARIABLE 10KOHM
RT 205	5007435	SEMI VARIABLE 10KOHM
RT 231	5030084	SEMI VARIABLE 1KOHM
RT 251	5030085	SEMI VARIABLE 2.2KOHM
RT 401	5030012	SEMI VARIABLE 220KOHM
RT 601	5030012	SEMI VARIABLE 220KOHM
RT1801	5030008	SEMI VARIABLE 22KOHM
		SEMI-CONDUCTORS
D 141	5380933	LED GL-451
D 201	5339491	DIODE 1N4531
D 202	5339491	DIODE 1N4531
D 203	5339491	DIODE 1N4531
D 204	5339491	DIODE 1N4531
D 205	5339491	DIODE 1N4531
D 206	5339491	DIODE 1N4531
D 401	5339131	DIODE 1SS254
D 751	5339381	DIODE ERA81-004
D 755	5339491	DIODE 1N4531
D 756	5339491	DIODE 1N4531
D 757	5339491	DIODE 1N4531
D 761	5339491	DIODE 1N4531
D 763	5339491	DIODE 1N4531
D 764	5339491	DIODE 1N4531
D 765	5339491	DIODE 1N4531
D 766	5339491	DIODE 1N4531
D 770	5339231	DIODE 1SR35-100A
D 771	5339231	DIODE 1SR35-100A
D 774	5339491	DIODE 1N4531
D 801	5339381	DIODE ERA81-004
D 802	5339491	DIODE 1N4531
D 803	5339491	DIODE 1N4531
D 804	5339491	DIODE 1N4531
D 805	5339231	DIODE 1SR35-100A
D 821	5339491	DIODE 1N4531
D 822	5339491	DIODE 1N4531
⚠ D 851	5339231	DIODE 1SR35-100A
⚠ D 852	5339231	DIODE 1SR35-100A
⚠ D 853	5339231	DIODE 1SR35-100A
⚠ D 854	5339231	DIODE 1SR35-100A
⚠ D 855	5339231	DIODE 1SR35-100A
⚠ D 856	5339231	DIODE 1SR35-100A
⚠ D 857	5339231	DIODE 1SR35-100A
⚠ D 858	5339231	DIODE 1SR35-100A
D 861	5339171	DIODE 1SS130
D 862	5339171	DIODE 1SS130
D 863	5339171	DIODE 1SS130

SYMBOL-No	P-No	DESCRIPTION
D 864	5339171	DIODE 1SS130
D 865	5339171	DIODE 1SS130
D 871	5339131	DIODE 1SS254
D1421	5339131	DIODE 1SS254
D1422	5339131	DIODE 1SS254
D1801	5339491	DIODE 1N4531
D1802	5339491	DIODE 1N4531
IC 141	5391282	IC DN6851
IC 201	1362232	IC HA118158NT
IC 203	1362261	IC CXL5507P
IC 401	1341493	IC XRA7767AS
IC 601	1360042	IC HD49741ANT
IC 751	1355648	IC M38174M8-107FP
IC 753	5300795	IC XRA6209U4
IC 754	1340002	IC S-8053ALB
IC 811	1342031	IC NJM2248S
IC 851	1341511	IC M5F7805L
IC1401	1352475	IC M50458-084FP
IC1441	1361932	IC BA7046A
IC1651	1360072	IC XRA6459P1
IC1751	1388711	PWB ASSY SBX1644
Q 141	5324661	TRANSISTOR PI-483F1
Q 201	5327073	TRANSISTOR DTC144ES
Q 202	5327073	TRANSISTOR DTC144ES
Q 203	5327073	TRANSISTOR DTC144ES
Q 204	5327063	TRANSISTOR 2SC1740S
Q 205	5327073	TRANSISTOR DTC144ES
Q 206	5327021	TRANSISTOR 2SA844CD
Q 207	5327063	TRANSISTOR 2SC1740S
Q 208	5327073	TRANSISTOR DTC144ES
Q 211	5327063	TRANSISTOR 2SC1740S
Q 212	5327073	TRANSISTOR DTC144ES
Q 213	5327021	TRANSISTOR 2SA844CD
Q 215	5327063	TRANSISTOR 2SC1740S
Q 216	5327073	TRANSISTOR DTC144ES
Q 217	5327063	TRANSISTOR 2SC1740S
Q 218	5327063	TRANSISTOR 2SC1740S
Q 220	5327073	TRANSISTOR DTC144ES
Q 402	5327091	TRANSISTOR 2SD1504E
Q 403	5327091	TRANSISTOR 2SD1504E
Q 404	5327075	TRANSISTOR XDC144ES
Q 405	5327091	TRANSISTOR 2SD1504E
Q 406	5327101	TRANSISTOR 2SC3553(B/C)
Q 603	5327063	TRANSISTOR 2SC1740S
Q 753	5327073	TRANSISTOR DTC144ES
Q 755	5327073	TRANSISTOR DTC144ES
Q 801	5327021	TRANSISTOR 2SA844CD
Q 802	5327031	TRANSISTOR 2SA673C
Q 821	5327031	TRANSISTOR 2SA673C
Q 822	5327075	TRANSISTOR XDC144ES
Q 823	5327031	TRANSISTOR 2SA673C
Q 824	5327075	TRANSISTOR XDC144ES
Q 825	1320004	TRANSISTOR 2SA854SQR
Q 826	5327063	TRANSISTOR 2SC1740S
Q 853	5327075	TRANSISTOR XDC144ES
Q 854	1321341	TRANISITOR 2SD1765
Q 855	1321341	TRANISITOR 2SD1765
Q1421	5327063	TRANSISTOR 2SC1740S
Q1422	5327063	TRANSISTOR 2SC1740S
Q1423	5327063	TRANSISTOR 2SC1740S
Q1424	5327063	TRANSISTOR 2SC1740S
Q1431	5327063	TRANSISTOR 2SC1740S
Q1432	5327063	TRANSISTOR 2SC1740S
Q1433	1320012	TRANSISTOR 2SA933 (S,R)
Q1434	5327075	TRANSISTOR XDC144ES

SYMBOL-No	P-No	DESCRIPTION
Q1435	5327075	TRANSISTOR XDC144ES
Q1443	5327063	TRANSISTOR 2SC1740S
Q1802	5327063	TRANSISTOR 2SC1740S
QF 801	5721941	IC PROTECTOR
ZD 751	5339263	ZENER DIODE HZS7-A1
ZD 752	5339262	ZENER DIODE HZC6C-2
ZD 753	5339281	ZENER DIODE HZS11-A2
ZD 757	5339299	ZENER DIODE HZS5B1
ZD 853	5339268	ZENER DIODE HZS11B2
ZD 855	5339255	ZENER DIODE HZS12-C3T
ZD1801	5339288	ZENER DIODE HZS30-3
		TRANSFORMERS
T 401	5262545	OSCILLATOR,BIAS
⚠ T 851	5214361	TRANSFORMER,POWER
		COILS
L 201	5159155	CHOKE COIL 120UH+-10%
L 202	5159145	CHOKE COIL 22UH
L 205	5159147	CHOKE COIL 33UH
L 207	5159141	CHOKE COIL 10UH
L 208	5159152	CHOKE COIL 68UH
L 209	5159147	CHOKE COIL 33UH
L 210	5159149	CHOKE COIL 47UH
L 211	5159077	CHOKE COIL 100UH+-10%
L 212	5159141	CHOKE COIL 10UH
L 213	5159077	CHOKE COIL 100UH+-10%
L 214	5121184	COIL 100UH
L 215	5159152	CHOKE COIL 68UH
L 216	5159152	CHOKE COIL 68UH
L 217	5159077	CHOKE COIL 100UH+-10%
L 218	5159077	CHOKE COIL 100UH+-10%
L 220	5159077	CHOKE COIL 100UH+-10%
L 221	5159089	CHOKE COIL 820UH+-10%
L 223	5159149	CHOKE COIL 47UH
L 224	5159158	CHOKE COIL 220UH
L 225	5159158	CHOKE COIL 220UH
L 226	5159142	CHOKE COIL 12UH
L 401	5159077	CHOKE COIL 100UH+-10%
L 402	5159111	CHOKE COIL 5600UH

SYMBOL-No	P-No	DESCRIPTION
L 801	5159077	CHOKE COIL 100UH+-10%
L 802	5159077	CHOKE COIL 100UH+-10%
L1402	5159077	CHOKE COIL 100UH+-10%
L1403	5159077	CHOKE COIL 100UH+-10%
L1801	5159068	CHOKE COIL 22UH+-10%
L1802	5159077	CHOKE COIL 100UH+-10%
L1811	5159133	COIL,CHOKE 2.2UH+-20%
		CRYSTALS
X 201	5778291	CRYSTAL 3.58MHZ
X 751	5784478	OSCILLATOR
X 752	5783001	CRYSTAL
X1401	5781793	OSCILLATOR
		MISCELLANEOUS
BL 602	5272376	FILTER
CP 201	5165271	LOW PASS FILTER
CP 202	5163574	FILTER,BAND PASS
CP 203	5165053	LC FILTER
CP 204	5165095	COIL,TRAP
CP 205	5163591	BAND PASS FILTER
CP 208	5165281	HIGHT PASS FILTER
CP1401	5163375	FILTER,LOW PASS
DG 751	5315321	FLUORESCENT INDICATOR TUBE
DL 201	5786331	DELAY LINE
⚠ FU 851	5722651	FUSE 1.6A
⚠ FU 852	5721983	FUSE 3A
⚠ FU 853	5722651	FUSE 1.6A
S 141	5635321	SWITCH
S 142	5635331	SWITCH
S1755	5634884	SWITCH
S1756	5634884	SWITCH
S1757	5634884	SWITCH
S1758	5634884	SWITCH
S1759	5634884	SWITCH
S1761	5634884	SWITCH
S1762	5634884	SWITCH
S1763	5634884	SWITCH
S1771	5634884	SWITCH

ELECTRICAL PARTS LIST(VT-M251A, AW)

SYMBOL-No	P-No	DESCRIPTION
		CAPACITORS
C 203	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 204	0890013	CERAMIC DISC 22PF+-5% 50V
C 205	0890023	CERAMIC DISC 120PF+-10% 50V
C 207	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 209	0890011	CERAMIC DISC 15PF+-5% 50V
C 216	0890016	CERAMIC DISC 39PF+-50% 50V
C 217	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 219	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 220	0890023	CERAMIC DISC 120PF+-10% 50V
C 221	0890016	CERAMIC DISC 39PF+-50% 50V
C 227	0890038	CERAMIC DISC 3300PF+-20% 16V
C 233	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 234	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 240	0890004	CERAMIC DISC 3.3PF+-10% 50V
C 242	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 243	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 244	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 245	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 249	0890031	CERAMIC DISC 470PF+-10% 50V
C 251	0890016	CERAMIC DISC 39PF+-50% 50V
C 252	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 253	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 254	0890017	CERAMIC DISC 47PF+-5% 50V
C 257	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 259	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 260	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 262	0890013	CERAMIC DISC 22PF+-5% 50V
C 263	0890021	CERAMIC DISC 82PF+-10% 50V
C 264	0890014	CERAMIC DISC 27PF+-50% 50V
C 265	0890013	CERAMIC DISC 22PF+-5% 50V
C 266	0890017	CERAMIC DISC 47PF+-5% 50V
C 268	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 271	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 272	0890035	CERAMIC DISC 1000PF 50V
C 273	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 276	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 277	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 279	0890018	CERAMIC DISC 56PF+-50% 50V
C 280	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 292	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 299	0890034	CERAMIC DISC 820PF+-10% 5V
C 405	0890042	CERAMIC DISC 8200PF+-20% 16V
C 410	0890029	CERAMIC DISC 390PF+-10% 50V
C 412	0890035	CERAMIC DISC 1000PF 50V
C 415	0890038	CERAMIC DISC 3300PF+-20% 16V
C 419	0890039	CERAMIC DISC 4700PF+-20% 16V
C 421	0890037	CERAMIC DISC 2200PF+-20% 16V
C 422	0204271	POLYESTER FILM 8200PF+-5% 100V
C 611	0890035	CERAMIC DISC 1000PF 50V
C 617	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 619	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 621	0890026	CERAMIC DISC 220PF+-10% 50V
C 623	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 624	0890024	CERAMIC DISC 150PF+-10% 50V
C 626	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 627	0890038	CERAMIC DISC 3300PF+-20% 16V
C 631	0890014	CERAMIC DISC 27PF+-50% 50V
C 754	0127512	CERAMIC DISC 0.047UF+80-20% 50V
C 755	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 759	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 761	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 762	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 763	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 769	0890118	CERAMIC DISC 22PF+-5% 50V
C 770	0890118	CERAMIC DISC 22PF+-5% 50V
C 772	0890102	CERAMIC DISC 0.022UF+80-20% 50V
C 773	0890102	CERAMIC DISC 0.022UF+80-20% 50V
C 776	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 777	0890046	CERAMIC DISC 0.1UF+80-20% 50V
C 779	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 781	0890022	CERAMIC DISC 100PF+-10% 50V
C 782	0890022	CERAMIC DISC 100PF+-10% 50V
C 783	0890103	CERAMIC DISC 47000PF+80-20% 12V
C 784	0890027	CERAMIC DISC 270PF+-10% 50V
C 785	0890027	CERAMIC DISC 270PF+-10% 50V
C 786	0890103	CERAMIC DISC 0.047UF+80-20% 12V
C 787	0890103	CERAMIC DISC 0.047UF+80-20% 12V
C 804	0890024	CERAMIC DISC 150PF+-10% 50V
C 805	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C 806	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 809	0890038	CERAMIC DISC 3300PF+-20% 16V
C 810	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C 816	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C 817	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 819	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 820	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 851	0890102	CERAMIC DISC 0.022UF+80-20% 50V (VT-M251A)
C 852	0890102	CERAMIC DISC 0.022UF+80-20% 50V (VT-M251A)
C 857	0256865	ELECTROLYTIC 3300UF 25V (VT-M251A)
C 858	0890044	CRRAMIC DISC 0.022UF+80-20% 25V (VT-M251A)
C 861	0256861	ELECTROLTIC 2200UF 16V (VT-M251A)
C 901	0890014	CERAMIC DISC 27PF+-50% 50V
C 902	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 903	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 904	0890032	CERAMIC DISC 560PF+-10% 50V
C 905	0890016	CERAMIC DISC 39PF+-50% 50V
C 906	0890043	CERAMIC DISC 0.01UF+-20% 16V
C 907	0890043	CERAMIC DISC 0.01UF+-20% 16V
⚠ C1001	4130557	CERAMIC DISC 100PF 250V (VT-M251AW)
⚠ C1002	4130557	CERAMIC DISC 100PF 250V (VT-M251AW)
C1003	4130572	CERAMIC DISC 0.22UF 250V(VT-M251AW)
C1004	4130567	CERAMIC DISC 3300PF 250V(VT-M251AW)
C1005	4130556	ELECTROLYTIC 82UF 400V (VT-M251AW)
C1006	4130565	MYLAR 0.47UF 400V(VT-M251AW)
C1007	4130559	CERAMIC DISC 220PF 1KV (VT-M251AW)
C1008	4130564	MYLAR 4700PF (VT-M251AW)
C1009	4130563	MYLAR 1000PF (VT-M251AW)
C1011	4130568	CERAMIC DISC 2.2PF (VT-M251AW)
C1013	4130562	CERAMIC DISC 1000PF (VT-M251AW)
C1015	4130554	ELECTROLYTIC 1000UF 18V(VT-M251AW)
C1016	7071802	ELECTROLYTIC 10UF 50V (VT-M251AW)
C1017	4130291	ELECTROLYTIC 330UF 18V (VT-M251AW
C1018	7071802	ELECTROLYTIC 10UF 50V (VT-M251AW)
C1019	4130554	ELECTROLYTIC 1000UF 18V (VT-M251AW)
C1020	7071799	ELECTROLYTIC 1000UF 6.3V(VT-M251AW)
C1021	4130571	CERAMIC DISC 1000PF (VT-M251AW)
C1022	7071808	CERAMIC DISC 1000PF (VT-M251AW)
C1023	7071798	CERAMIC DISC 100UF 6.3V (VT-M251AW)
C1024	4130561	CERAMIC DISC 0.01UF (VT-M251AW)
⚠ C1025	4130566	MYLAR 0.01UF 250V(VT-M251AW)
⚠ C1026	4130566	MYLAR 0.01UF 250V(VT-M251AW)
C1027	4130558	CERAMIC DISC 100PF 1KV (VT-M251AW)
C1029	4130288	ELECTROLYTIC 1UF 50V (VT-M251AW)
C1031	4130568	CERAMIC DISC 2.2PF (VT-M251AW)
C1032	4130568	CERAMIC DISC 2.2PF (VT-M251AW)
⚠ C1033	4130555	ELECTROLYTIC 1UF 400V (VT-M251AW)
C1037	4130569	CERAMIC DISC 2200PF (VT-M251AW)
⚠ C1038	4130557	CERAMIC DISC 100PF 250V(VT-M251AW)

SYMBOL-No	P-No	DESCRIPTION
⚠ C1039	4130566	MYLAR 0.01UF 250V(VT-M251AW)
C1040	4130561	CERAMIC DISC 0.01UF (VT-M251AW)
C1402	0890044	CERAMIC DISC 0.022UF+80-20% 25V
C1409	0890116	CERAMIC DISC 15PF+-5% 50V
C1410	0890115	CERAMIC DISC 12PF+-5% 50V
C1443	0890013	CERAMIC DISC 22PF+-5% 50V
C1446	0890038	CERAMIC DISC 3300PF+-20% 16V
C1448	0890031	CERAMIC DISC 470PF+-10% 50V
C1654	0890045	CERAMIC DISC 0.047UF+80-20% 50V
C1803	0890073	CERAMIC DISC 82PF+-5% 50V
C1804	0890027	CERAMIC DISC 270PF+-10% 50V
C1805	0890028	CERAMIC DISC 330PF+-10% 50V
C1808	0890035	CERAMIC DISC 1000PF 50V
C1851	0890044	CERAMIC DISC 0.022UF+80-20% 25V
		RESISTORS
R 705	0101765	CHIP RESISTOR 10KOHM+-1% 1/8W
⚠ R 852	0170477	FUSE RESISTOR 8.2OHM+-5% 1/4W
RT 2315030084		SEMI VARIABLE 1KOHM
RT 2515030085		SEMI BARIABLE 2.2KOHM
RT 4015030012		SEMI VARIABLE 220KOHM
RT 6015030012		SEMI VARIABLE 220KOHM
RT 1815030008		SEMI VARIABLE 22KOHM
⚠ R1002	4130547	CARBON FILM 2.2 OHM 2W(VT-M251AW)
⚠ R1003	4130553	METAL FILM 330KOHM 2W(VT-M251AW)
R1004	7071795	METAL FILM 120KOHM (VT-M251AW)
R1005	7071795	METAL FILM 120KOHM (VT-M251AW)
R1006	4130549	METAL OXIDE 33 OHM (VT-M251AW)
R1007	4130545	CARBON FILM 22KOHM (VT-M251AW)
⚠ R1010	4130551	FUSE RESISTOR 10 OHM (VT-M251AW)
⚠ R1011	7071789	CARBON FILM 10 OHM (VT-M251AW)
⚠ R1012	4130283	FUSE RESISTOR 2.7 OHM (VT-M251AW)
R1013	4130548	CARBON FILM 100 OHM (VT-M251AW)
R1014	4130542	CARBON FILM 12KOHM (VT-M251AW)
⚠ R1015	4130552	METAL FILM 0.56 OHM 1W(VT-M251AW)
R1016	4130544	CARBON FILM 22 OHM (VT-M251AW)
R1018	4130285	METAL FILM 0.1 OHM 1W(VT-M251AW)
R1019	4130546	CARBON FILM 27KOHM (VT-M251AW)
⚠ R1020	4130541	CARBON FILM 1KOHM (VT-M251AW)
R1026	4130543	CARBON FILM 1 OHM (VT-M251AW)
R1443	0101736	METAL FILM 120KOHM 1/8W
R1454	0101765	CHIP RESISTOR 10KOHM+-1% 1/8W
		SEMI-CONDUCTORS
D 141	5380933	LED GL-451
D 201	5339131	DIODE 1SS254
D 202	5339131	DIODE 1SS254
D 203	5339131	DIODE 1SS254
D 204	5339131	DIODE 1SS254
D 401	5339131	DIODE 1SS254
D 751	5339381	DIODE ERA81-004
D 756	5339491	DIODE 1N4531
D 757	5339491	DIODE 1N4531
D 761	5339491	DIODE 1N4531
D 763	5339491	DIODE 1N4531
D 764	5339491	DIODE 1N4531
D 765	5339491	DIODE 1N4531
D 766	5339491	DIODE 1N4531
D 768	5339491	DIODE 1N4531
D 770	5339231	DIODE 1SR35-100A
D 771	5339231	DIODE 1SR35-100A
D 772	5339491	DIODE 1N4531
D 773	5339491	DIODE 1N4531
D 774	5339491	DIODE 1N4531

SYMBOL-No	P-No	DESCRIPTION
D 801	5339381	DIODE ERA81-004
D 802	5339491	DIODE 1N4531
D 803	5339491	DIODE 1N4531
D 804	5339491	DIODE 1N4531
D 805	5339381	DIODE ERA81-004
D 821	5339491	DIODE 1N4531
D 822	5339491	DIODE 1N4531
⚠ D 851	5339231	DIODE 1SR35-100A (VT-M251A)
⚠ D 852	5339231	DIODE 1SR35-100A (VT-M251A)
⚠ D 853	5339231	DIODE 1SR35-100A (VT-M251A)
⚠ D 854	5339231	DIODE 1SR35-100A (VT-M251A)
⚠ D 855	5339231	DIODE 1SR35-100A (VT-M251A)
⚠ D 856	5339231	DIODE 1SR35-100A (VT-M251A)
⚠ D 857	5339231	DIODE 1SR35-100A (VT-M251A)
⚠ D 858	5339231	DIODE 1SR35-100A (VT-M251A)
D 861	5339171	DIODE 1SS130 (VT-M251A)
D 862	5339171	DIODE 1SS130 (VT-M251A)
D 863	5339171	DIODE 1SS130 (VT-M251A)
D 864	5339171	DIODE 1SS130 (VT-M251A)
D 865	5339171	DIODE 1SS130 (VT-M251A)
D 871	5339131	DIODE 1SS254 (VT-M251A)
⚠ D1001	5382491	DIODE S1WBA60Z (VT-M251AW)
D1002	5382461	DIODE ERA34-10 (VT-M251AW)
D1003	5382471	DIODE ERB12-01 (VT-M251AW)
D1005	5382301	DIODE MA858 (VT-M251AW)
D1006	5336991	DIODE MA165 (VT-M251AW)
⚠ D1007	5336322	DIODE EG01 (VT-M251AW)
⚠ D1008	5382481	DIODE ERC81-006 (VT-M251AW)
⚠ D1009	5336322	DIODE EG01 (VT-M251AW)
⚠ D1010	5331431	DIODE ERB81 SI 1MHZ 0.2W(VT-M251AW)
⚠ D1011	5382341	DIODE MA178 (VT-M251AW)
D1012	5336981	DIODE MA4051N-M (VT-M251AW)
D1013	5336811	DIODE MA2180A (VT-M251AW)
D1014	5336811	DIODE MA2180A (VT-M251AW)
D1015	5382451	DIODE ERA15-04 (VT-M251AW)
D1016	5382501	DIODE MA2100 (VT-M251AW)
D1017	5382341	DIODE MA178 (VT-M251AW)
D1421	5339131	DIODE 1SS254
D1422	5339131	DIODE 1SS254
D1751	5339131	DIODE 1SS254
D1752	5339131	DIODE 1SS254
D1801	5339491	DIODE 1N4531
D1802	5339491	DIODE 1N4531
IC 141	5391282	IC DN6851
IC 142	5391282	IC DN6851
IC 201	1373066	IC HT7233E (VT-M251A)
IC 201	1373336	IC HT7273E (VT-M251AW)
IC 203	1362261	IC CXL5507P
IC 401	1341493	IC XRA7767AS
IC 601	1360042	IC HD49741ANT
IC 751	1355648	IC M38174M8-107FP
IC 753	5300795	IC XRA6209U4
IC 754	1340002	IC S-8053ALB
IC 811	1342031	IC NJM2248S
IC 851	1341511	IC H5F7805L (VT-M251A)
IC1001	5390471	IC ON3105-V (VT-M251AW)
IC1002	1388691	IC VCRS0124 (VT-M251AW)
IC1401	1352475	IC M50458-084FP
IC1441	1361932	IC BA7046A
IC1651	1360072	IC XRA6459P1
IC1751	1388711	PWB ASSY SBX1644
Q 141	5324661	TRANSISTOR PT-483F1
Q 204	5327063	TRANSISTOR 2SC1740S
Q 205	5327075	TRANSISTOR XDC144ES
Q 206	5327021	TRANSISTOR 2SAB44CD

SYMBOL-No	P-No	DESCRIPTION
Q 207	5327063	TRANSISTOR 2SC1740S
Q 208	5327075	TRANSISTOR XDC144ES
Q 211	5327063	TRANSISTOR 2SC1740S
Q 212	5327075	TRANSISTOR XDC144ES
Q 213	5327021	TRANSISTOR 2SA844CD
Q 215	5327063	TRANSISTOR 2SC1740S
Q 216	5327075	TRANSISTOR XDC144ES
Q 217	5327063	TRANSISTOR 2SC1740S
Q 218	5327063	TRANSISTOR 2SC1740S
Q 220	5327075	TRANSISTOR XDC144ES
Q 402	5327091	TRANSISTOR 2SD1504E
Q 403	5327091	TRANSISTOR 2SD1504E
Q 404	5327075	TRANSISTOR XDC144ES
Q 405	5327091	TRANSISTOR 2SD1504E
Q 406	5327101	TRANSISTOR 2SC3553(B/C)
Q 603	5327063	TRANSISTOR 2SC1740S
Q 752	5324631	TRANSISTOR 2SA1390C
Q 753	5327073	TRANSISTOR DTC144ES
Q 755	5327073	TRANSISTOR DTC144ES
Q 756	5327073	TRANSISTOR DTC144ES
Q 801	5327021	TRANSISTOR 2SA844CD
Q 802	5327031	TRANSISTOR 2SA673C
Q 821	5327031	TRANSISTOR 2SA673C
Q 822	5327075	TRANSISTOR XDC144ES
Q 823	5327031	TRANSISTOR 2SA673C
Q 824	5327075	TRANSISTOR XDC144ES
Q 825	1320004	TRANSISTOR 2SA854SQR
Q 826	5327063	TRANSISTOR 2SC1740S
Q 853	5327075	TRANSISTOR XDC144ES (VT-M251A)
Q 854	1321341	TRANSISTOR 2SD1765 (VT-M251A)
Q 855	1321341	TRANSISTOR 2SD1765 (VT-M251A)
Q 901	5327061	TRANSISTOR 2SC1740S-ST
Q 902	5327061	TRANSISTOR 2SC1740S-ST
Q 903	5327061	TRANSISTOR 2SC1740S-ST
Q 904	5327061	TRANSISTOR 2SC1740S-ST
⚠ Q 1001	1322181	TRANSISTOR 2SK796 (VT-M251AW)
⚠ Q 1002	1321921	TRANSISTOR 2SD636 (VT-M251AW)
⚠ Q 1003	1322171	TRANSISTOR 2SB1050 (VT-M251AW)
Q 1421	5327063	TRANSISTOR 2SC1740S
Q 1422	5327063	TRANSISTOR 2SC1740S
Q 1423	5327063	TRANSISTOR 2SC1740S
Q 1424	5327063	TRANSISTOR 2SC1740S
Q 1431	5327063	TRANSISTOR 2SC1740S
Q 1432	5327063	TRANSISTOR 2SC1740S
Q 1433	1320012	TRANSISTOR 2SA933 (S,R)
Q 1434	5327075	TRANSISTOR XDC144ES
Q 1435	5327075	TRANSISTOR XDC144ES
Q 1443	5327063	TRANSISTOR 2SC1740S
Q 1802	5327063	TRANSISTOR 2SC1740S
Q 1851	1321341	TRANISITOR 2SD1765 (VT-M251AW)
Q 1852	1321341	TRANISITOR 2SD1765 (VT-M251AW)
Q 1853	5327075	TRANSISTOR XDC144ES (VT-M251AW)
QF 801	5721943	IC PROTECTOR
QF 802	5721802	IC PROTECTER
ZD 751	5339263	ZENER DIODE HZS7-A1
ZD 752	5339277	ZENER DIODE HZS6A2
ZD 753	5339281	ZENER DIODE HZS11-A2
ZD 754	5339287	ZENER DIODE HZS9A3
ZD 755	5339471	ZENER DIODE HZS24-3T(VT-M251A)
ZD 757	5339299	ZENER DIODE HZS5B1 (VT-M251A)
ZD 853	5339268	ZENER DIODE HZS11B2 (VT-M251A)
ZD 855	5339255	ZENER DIODE HZS12-C3T (VT-M251A)
ZD1801	53392883	ZENER DIODE HZS30-3
ZD1851	5339255	ZENER DIODE HZS12-C3T (VT-M251AW)
ZD1852	5339268	ZENER DIODE HZS11B2 (VT-M251AW)

SYMBOL-No	P-No	DESCRIPTION
TRANSFORMERS		
T 401	5262545	OSCILLATOR,BIAS
⚠ T 851	5214192	TRANSFORMER,POWER (VT-M251A)
⚠ T1001	4130575	TRANSFORMER (VT-M251AW)
COILS		
L 202	5159145	CHOKE COIL 22UH
L 205	5159147	CHOKE COIL 33UH
L 207	5159141	CHOKE COIL 10UH
L 208	5159152	CHOKE COIL 68UH
L 209	5159147	CHOKE COIL 33UH
L 210	5159149	CHOKE COIL 47UH
L 211	5159077	CHOKE COIL 100UH+-10%
L 212	5159141	CHOKE COIL 10UH
L 213	5159077	CHOKE COIL 100UH+-10%
L 214	5121184	COIL 100UH
L 215	5159152	CHOKE COIL 68UH
L 216	5159152	CHOKE COIL 68UH
L 217	5159077	CHOKE COIL 100UH+-10%
L 218	5159077	CHOKE COIL 100UH+-10%
L 220	5159077	CHOKE COIL 100UH+-10%
L 221	5159089	CHOKE COIL 820UH+-10%
L 223	5159149	CHOKE COIL 47UH
L 224	5159156	CHOKE COIL 220UH
L 225	5159158	CHOKE COIL 220UH
L 401	5159077	CHOKE COIL 100UH+-10%
L 402	5159111	CHOKE COIL 5600UH
L 801	5159077	CHOKE COIL 100UH+-10%
L 802	5159077	CHOKE COIL 100UH+-10%
L 804	5159082	CHOKE COIL 220UH+-10% (VT-M251A)
L 901	5159077	CHOKE COIL 100UH (VT-M251A)
L 901	5159154	CHOKE COIL 100UH (VT-M251AW)
L 902	5159145	CHOKE COIL 22UH
⚠ L1001	7071819	COIL (VT-M251AW)
L1002	7071822	COIL (VT-M251AW)
L1003	7071822	COIL (VT-M251AW)
L1004	4130573	COIL (VT-M251AW)
L1005	4130574	COIL (VT-M251AW)
L1402	5159077	CHOKE COIL 100UH+-10%
L1403	5159077	CHOKE COIL 100UH+-10%
L1801	5159068	CHOKE COIL 22UH+-10%
L1802	5159077	CHOKE COIL 100UH+-10%
L1811	5159133	COIL,CHOKE 2.2UH+-20%
CRYSTALS		
X 751	5784478	OSCILLATOR
X 752	5783001	CRYSTAL
X1401	5781793	OSCILLATOR
MISCELLANEOUS		
BL 602	5272376	FILTER
CP 201	5164733	LOW PASS FILTER
CP 202	5165121	BAND PASS FILTER
CP 203	5165053	LC FILTER
CP 204	5165095	COIL,TRAP
CP 205	5163591	BAND PASS FILTER
CP 208	5162754	HIGHT PASS FILTER
CP1401	5163375	FILTER,LOW PASS
DG 751	5315321	FLUORESCENT INDICATOR TUBE
DL 201	5786331	DELAY LINE
⚠ FU 851	5722651	FUSE 1.6A (VT-M251A)
⚠ FU 852	5721983	FUSE 3A (VT-M251A)
⚠ FU 853	5722651	FUSE 1.6A (VT-M251A)

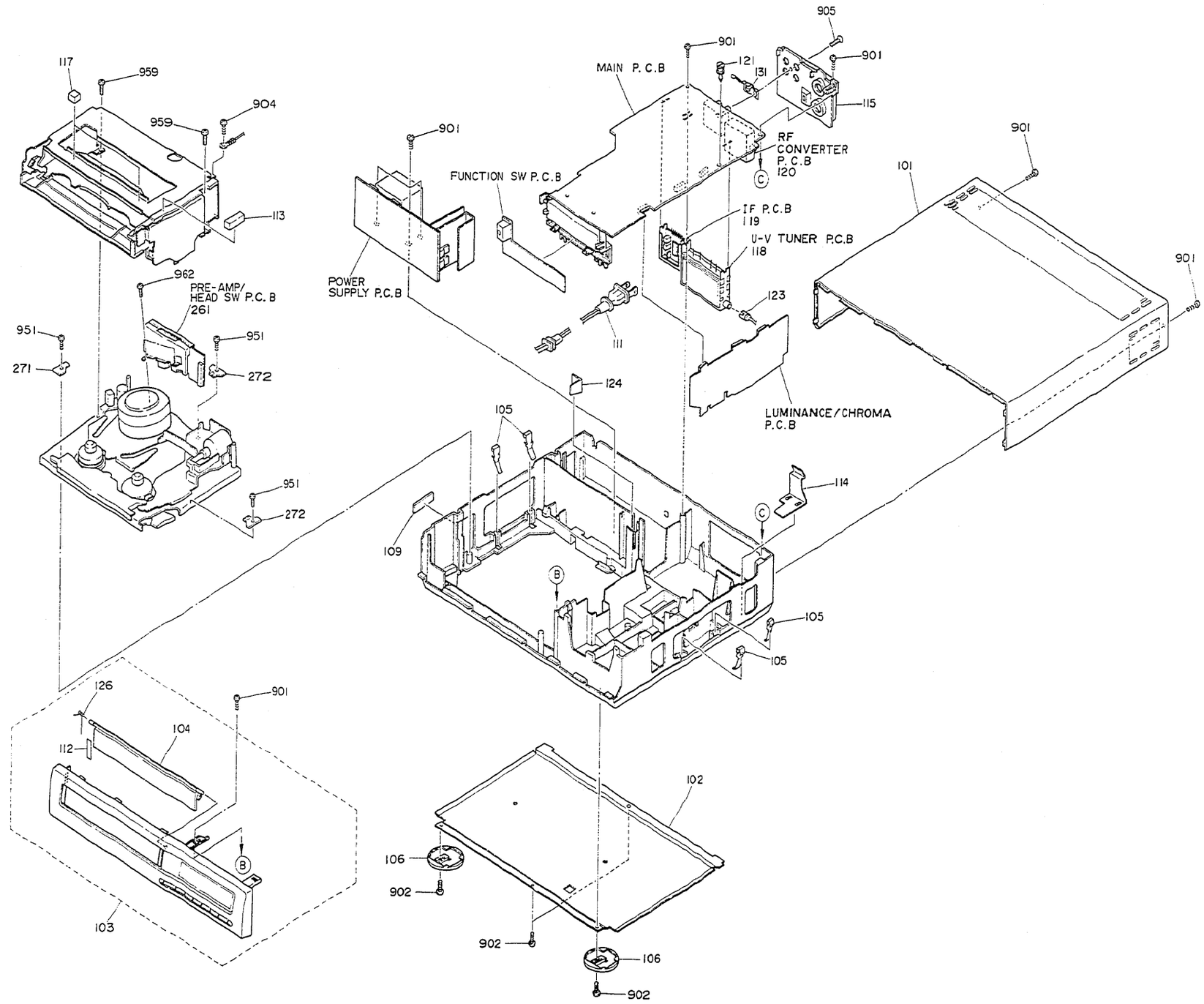
SYMBOL-No	P-No	DESCRIPTION
⚠ F1001	4130576	FUSE 2A (VT-M251AW)
JK1751	5674611	JACK
		MISCELLANEOUS
PR1001	5721807	IC PROTECTOR (VT-M251AW)
PR1002	4130577	IC PROTECTOR (VT-M251AW)
PR1003	5721807	IC PROTECTOR (VT-M251AW)
		MISCELLANEOUS
S 141	5635321	SWITCH
S 142	5635331	SWITCH
S1755	5634884	SWITCH
S1756	5634884	SWITCH
S1757	5634884	SWITCH
S1758	5634884	SWITCH
S1759	5634884	SWITCH
S1760	5634884	SWITCH
S1761	5634884	SWITCH
S1762	5634884	SWITCH
S1763	5634884	SWITCH
S1771	5634884	SWITCH

MECHANICAL PARTS LIST

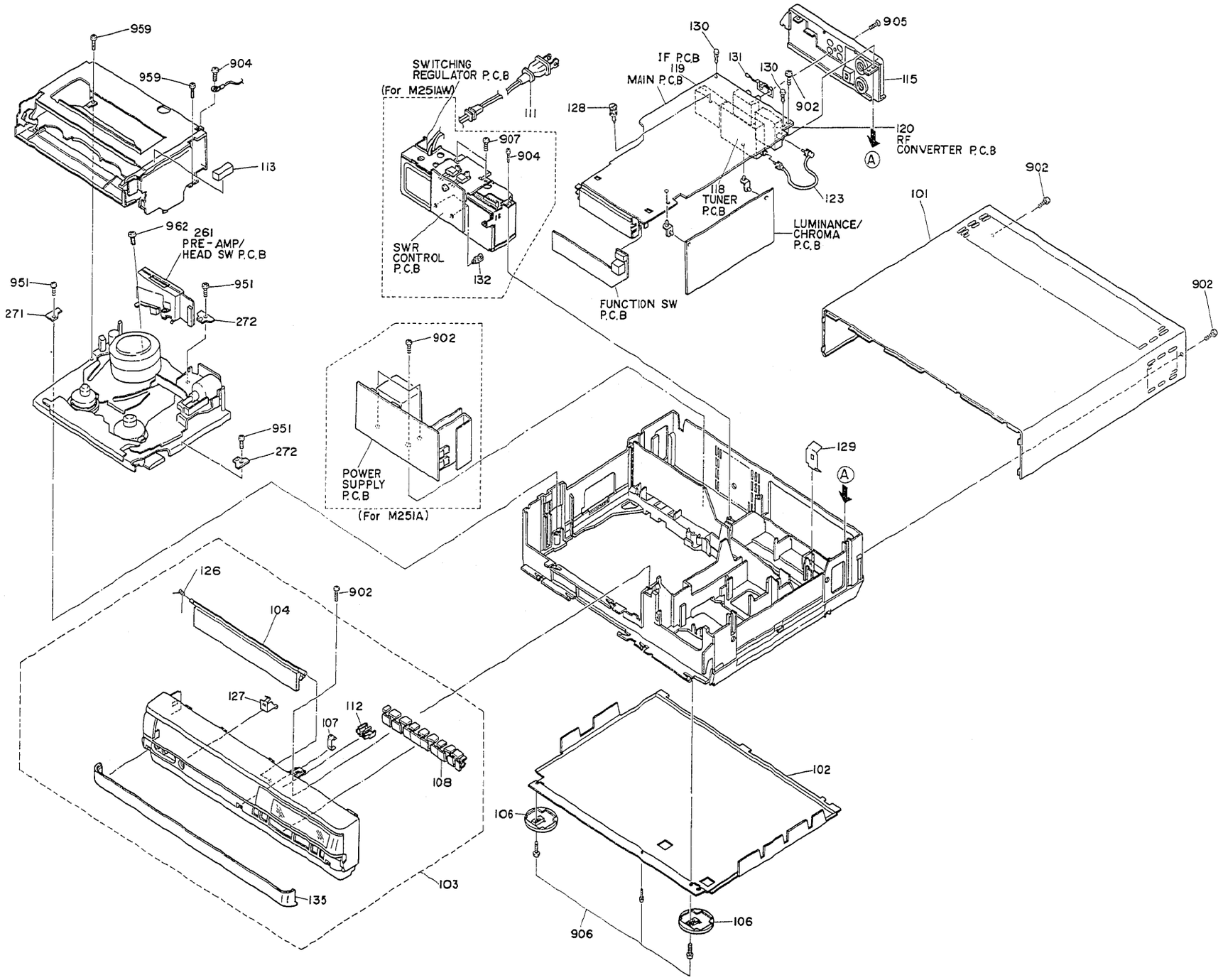
SYMBOL-No	P-No	DESCRIPTION
		FOR FINAL ASSEMBLY
101	6007295	COVER,TOP (VT-M251A,AW)
101	6006923	COVER,TOP (VT-M250A)
102	6007301	COVER,BOTTOM (VT-M251A,AW)
102	6006933	COVER,BOTTOM (VT-M250A)
103	4721191	PANEL,FRONT (VT-M251A,AW)
103	4720387	PANEL,FRONT (VT-M250A)
104	6489116	DOOR,CASSETTE (VT-M251A,AW)
104	6489908	DOOR,CASSETTE (VT-M250A)
105	6527686	PLATE (VT-M250A)
106	6443572	INSULATOR (VT-M251A,AW)
106	6442472	INSULATOR (VT-M250A)
107	6527402	SPRING,DOOR (VT-M251A,AW)
108	4742642	DOOR,BUTTON (VT-M251A,AW)
109	7674013	CUSHION (VT-M250A)
⚠ 111	7071833	CORD,POWER (VT-M251AW)
⚠ 111	5850753	CORD,POWER (VT-M250A,M251A)
112	6810443	STOPPER,DOOR (VT-M251A,AW)
112	6812431	STOPPER,DOOR (VT-M250A)
113	4330231	FILT
114	6528141	PLATE (VT-M250A)
115	4721202	PANEL,REAR (VT-M251A,AW)
115	4720912	PANEL,REAR (VT-M250A)
117	6562611	CUSHION,RUBBER (VT-M250A)
118	5582144	TUNER UNIT
119	5583823	IF UNIT
120	5589332	RF CONVERTER
121	6802271	BRACKET (VT-M250A)
123	5885985	CABLE
124	7703225	SPACER (VT-M250A)
126	6551851	SPRING,DOOR (VT-M251A,AW)
126	6552334	SPRING (VT-M250A)
127	4897131	PLATE (VT-M251A,AW)
128	6802271	BRACKET (VT-M251A,AW)
129	6528932	PLATE (VT-M251A,AW)
130	6714211	NYLON RIVET - 3MMD (VT-M251A,AW)
131	4898261	PLATE (VT-M251A,AW)
131	7479971	PLATE (VT-M250A)
132	6816171	BRACKET (VT-M251AW)
135	4722441	DOOR,CONTROL (VT-M251A,AW)
202	6915922	SCREW
203	7469871	BASE
204	5434061	HEAD
205	6304906	SPRING
206	6522752	SPRING
207	7785673	NUT
208	6896914	BRAKE
209	6555501	SPRING
210	6416122	REEL,SUPPLY
211	7789123	POLYSLIDER WASHER
212	6416131	REEL TABLE,TAKE UP
213	7789122	POLYSLIDER WASHER
214	6975766	ARM,PRESSER ROLLER
215	6804273	BLOCK,SLIDER
216	7412822	PLATE
217	7429651	GEAR,LOADING(L)
218	7429661	GEAR,LOADING(R)
219	6911551	GUIDE ROLLER BASE(IN)
220	6424261	ROLLER,GUIDE
221	69115723	GUIDE ROLLER BASE(OUT)
222	6911004	BASE
223	5445851	HEAD FULL ERASE
225	4508237	GUIDE,TAPE
226	6555431	SPRING
227	7413665	HOLDER-BAND
228	7412863	ARM
229	6555446	SPRING
230	6897265	BRACKET
231	6896752	ARM
232	6555061	SPRING
233	6820351	ARM
235	7468854	LOADING BLOCK
236	7398631	BRACKET
237	7412881	ARM
238	6976551	ARM
239	7412893	ARM
240	7428072	ARM OPERATION
241	6896903	BRAKE
242	6551151	SPRING

SYMBOL-No	P-No	DESCRIPTION
243	6804792	BRAKE
244	6896895	HOLDER,MOTOR
245	6896852	ARM
246	6897251	ARM
247	6555483	SPRING
248	6897271	ARM
249	6897066	GEAR,MODE
250	6434861	WORM WHEEL
251	6555052	SPRING
252	7799012	WASHER
255	4508235	GUIDE
257	6976372	ARM
258	7786623	POLYSLIDER WASHER
259	6898472	ARM,IDLE
261	4133355	PWB ASSY PRE AMP/HEAD SW
268	7472092	BRACKET
271	7429631	BRACKET
272	7429641	BRACKET
273	7472125	ARM
275	7788348	WASHER
276	6806622	BRAKE
277	6555061	SPRING
301	5571475	MOTOR,CAPSTAN
302	6804834	BASE
303	6351555	BELT
304	6897095	ARM,FF/REW
305	6434852	RACK
402	6804982	BRACKET
403	6804962	BRACKET
404	6896971	WORM WHEEL ASSY
405	6435571	WORM
406	4508221	WORM SHAFT
407	6804992	BRACKET
408	6896632	ARM-SWITCH
409	6302474	SPRING
410	6897041	ARM-SWITCH
411	7412583	BRACKET-GEAR
412	7449178	HOLDER
413	7449164	BASE,CASSETTE HOLDER
414	6896664	HOLDER,CASSETTE (R)
415	7428113	HOLDER,STAY
416	6820361	ARM
417	6897001	ARM
418	6556241	SPRING
419	6896673	HOLDER,CASSETTE (L)
420	7412944	ARM
421	6555772	SPRING
422	7412953	SPRING
423	6806531	HOLDER,FRONT
424	7580791	SHAFT ASSY
425	7428982	BRACKET
426	7794391	WASHER
501	5436107	CYLINDER,UPPER (CY-Z4NP-U)
502	5436492	CYLINDER,LOWER (CY-Z4NQ-L)
503	5792635	BRUSH,CYLINDER
901	8699410	SCREW(3X10) (VT-M251A)
902	8699412	SCREW (3X12) BLACK
904	86914063	3X6 BT BIND SCREW
905	7781582	FALT SCREW-3MMDX10MM (BLACK)
906	8699414	SCREW(3X14) (VT-M251A,AW)
907	8691408	SCREW (3X8) (VT-M251AW)
951	8691410	SCREW
952	8691308	SCREW BT2.6MMDX8MM
953	8699408	SCREW
954	7781872	SCREW-3MMDX8MM
955	7773086	SCREW
956	8741414	SCREW (3X14)
957	8691412	SCREW (3X12)
958	8691408	SCREW (3X8)
959	8711406	SCREW - 3X6 PAN HEAD SCREW
960	8741412	SCREW (B3X12)
961	7785941	SCREW
962	87114043	SCREW - 3X4 PAN HEADSCREW
963	7775581	SCREW(M3X14)
965	8741408	SCREW (B3X8)
998	7784131	SCREW(3X8)
999	8711405	SCREW(3X5)
		FOR ACCESSARIES
	5614895	REMOTE HAND SET (VT-M250A)
	5614883	REMOTE HAND SET (VT-M251A)
	5614896	REMOTE HAND SET (VT-M251AW)
	5861141	VCR COAXIAL RF CABLE(VT-M250A)
	5858853	CABLE (VT-M251A,AW)
	5662611	SEIMENS PLUG (VT-M251AW)

EXPLODED VIEWS
CABINET SECTION (For VT-M250A)



CABINET SECTION (For VT-M251A, AW)



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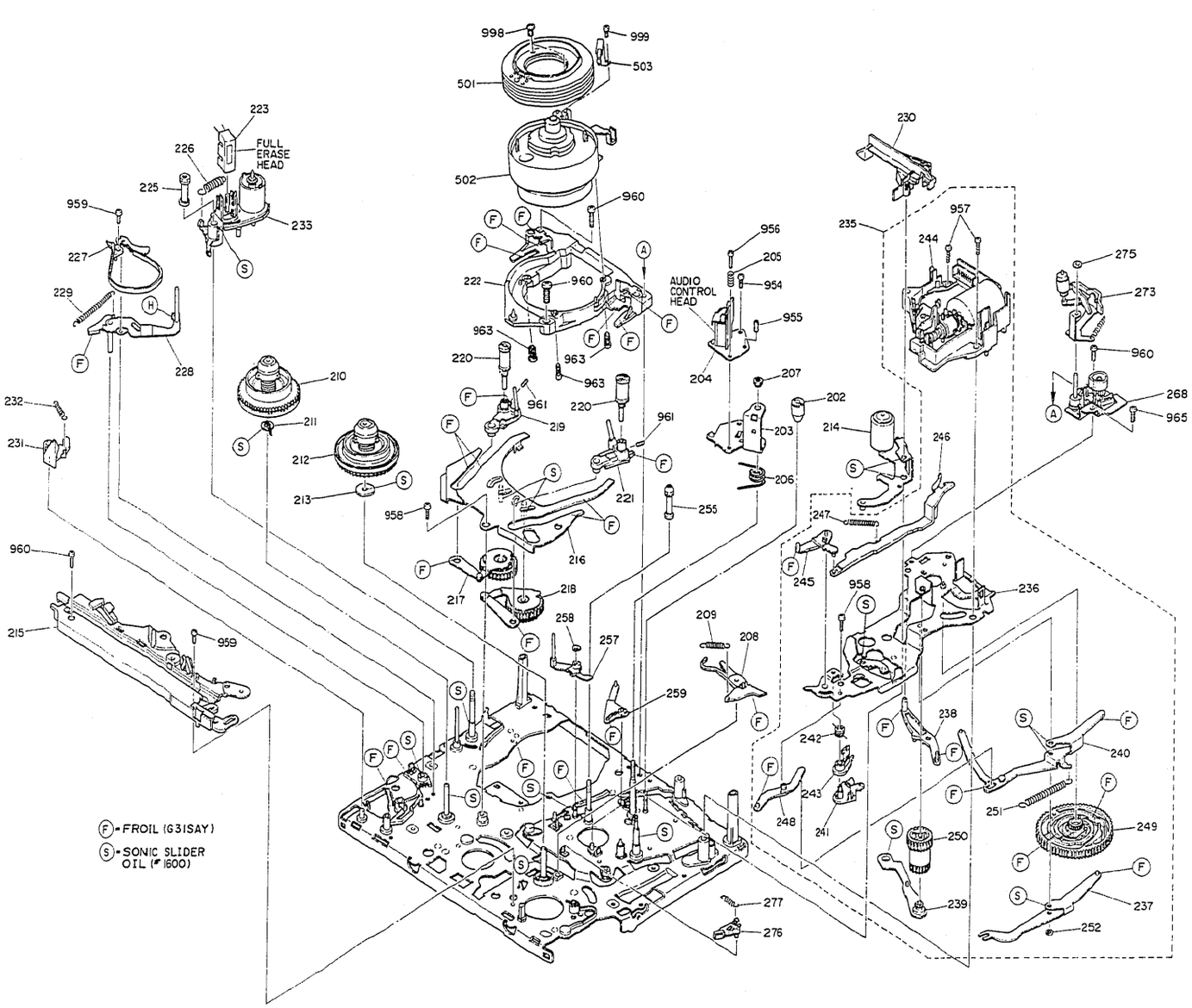
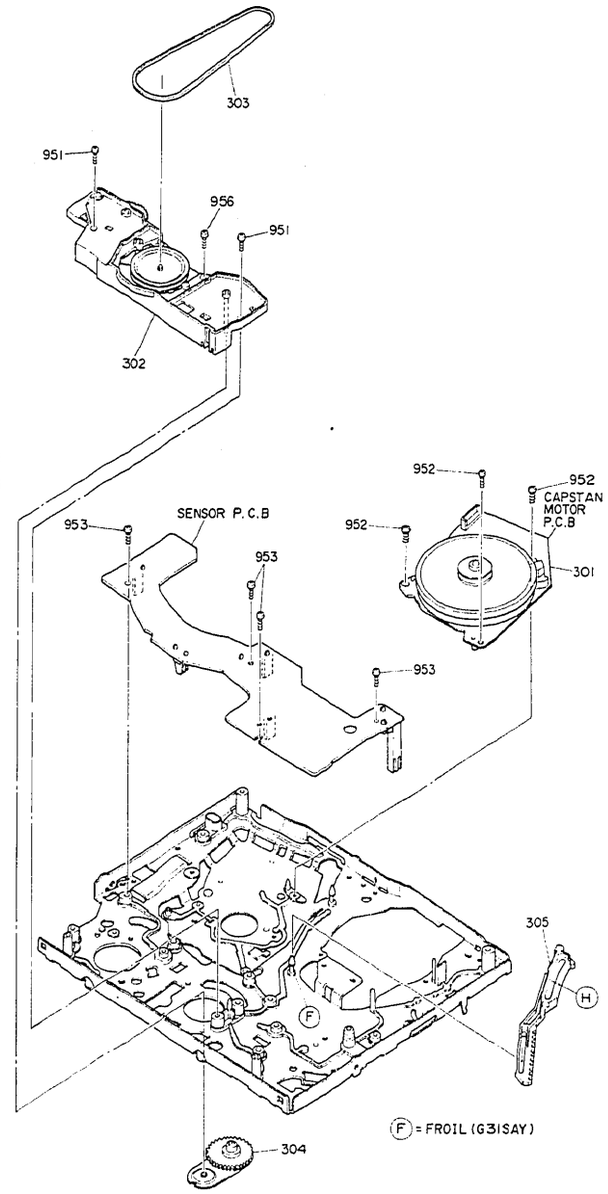
A B C D E

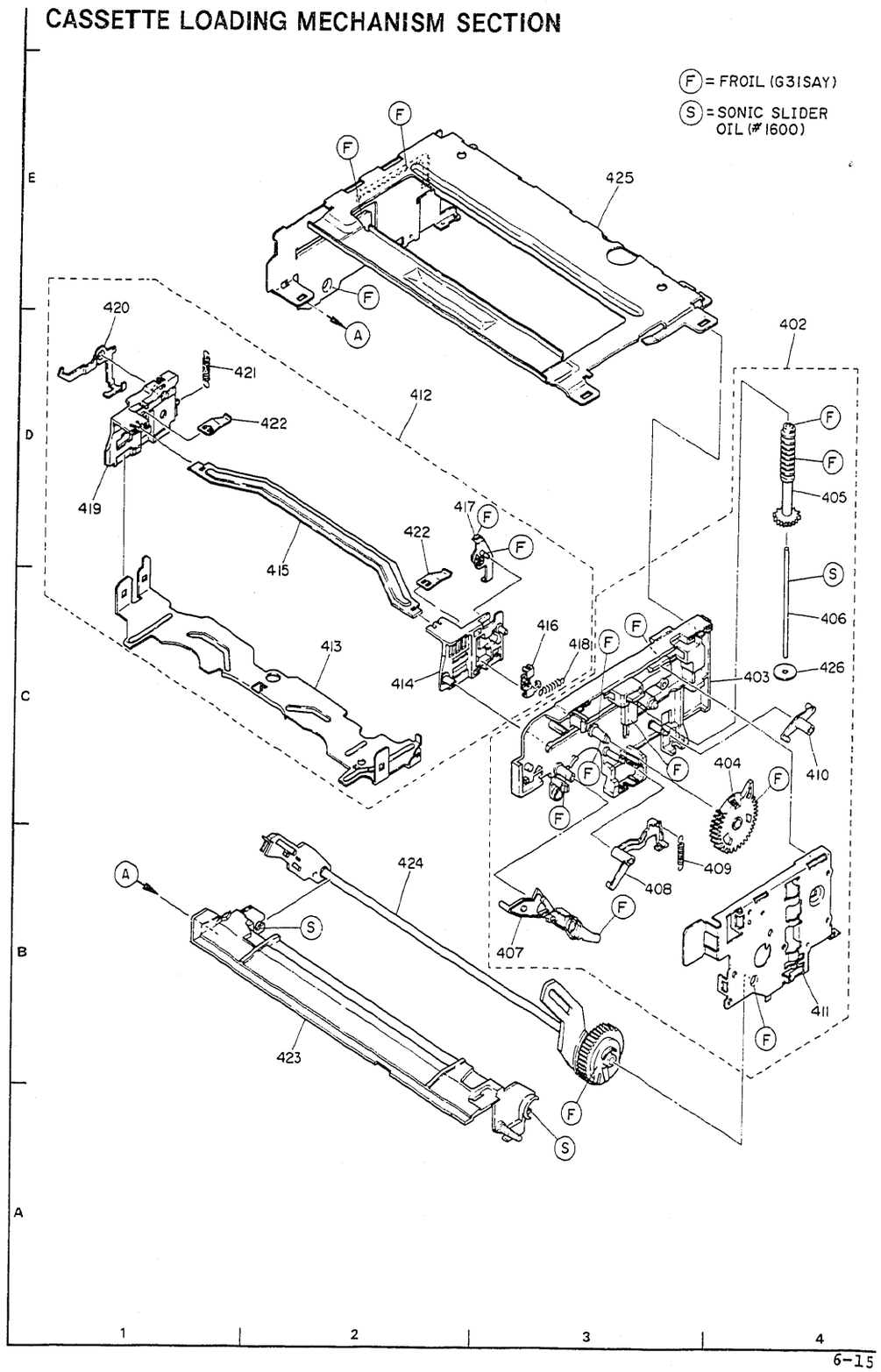
CHASSIS (I) SECTION



CHASSIS (II) SECTION



CASSETTE LOADING MECHANISM SECTION



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